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MANUAL PART NO.
MS30-V8202-00

WARNING:
SERVICING INSTRUCTIONS ARE FOR USE BY AUTHORIZED, SERVICE-TRAINED PERSONNEL ONLY. TO AVOID DANGEROUS ELECTRIC SHOCK, DO NOT REMOVE ANY PROTECTIVE COVERS OR PERFORM ANY SERVICING UNLESS QUALIFIED TO DO SO.

GOULD SERVICE MANUAL
MODEL 3200 AND 3400
THERMAL WRITING RECORDERS

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Gould Electronics, Test & Measurement Group
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MARKER

SAFETY SUMMARY

The general safety information is for both user and service personnel. Specific **WARNINGS** and **CAUTIONS** will be found throughout the manual where they apply.

TERMS IN THIS MANUAL

CAUTION statements identify conditions or practices that could result in damage to the equipment or other property. They will appear in boldfaced capital letters.

WARNING statements identify conditions or practices that could result in personal injury or loss of life. They will appear in boldfaced capital letters.

SYMBOLS IN THIS MANUAL

This symbol indicates where cautionary information is to be found.

TERMS AS MARKED ON EQUIPMENT

CAUTION indicates a personal injury hazard not immediately accessible as one reads the marking, or a hazard to property, including the equipment itself.

DANGER indicates a personal injury hazard immediately accessible as one reads the marking.

SYMBOLS AS MARKED ON EQUIPMENT

DANGER - High Voltage.

Protective ground (earth) terminal.

ATTENTION - Refer to manual.

POWER SOURCE

This instrument is intended to operate from a power source that does not apply more than 250 volts rms between the supply conductors or between either supply conductor and ground. A protective ground connection by way of the grounding conductor in the power cord is essential.

GROUNDING THE INSTRUMENT

This instrument is grounded through the grounding conductor of the power cord. A protective ground connection by way of the grounding conductor in the power cord is essential for safe operation.

DANGER ARISING FROM LOSS OF GROUND

Upon loss of the protective-ground connection, all accessible conductive parts (including knobs and controls that may appear to be insulating) can render an electric shock.

USE THE PROPER POWER CORD

Use only the power cord and connector specified for your instrument. Use only a power cord that is in good condition. For detailed information on power cords and connections see Section 2, Installation, in the User's Manual.

USE THE PROPER FUSE

Use only a fuse of the correct type, voltage rating and current rating as specified in the parts list for your instrument.

DO NOT OPERATE WITHOUT COVERS AND PANELS INSTALLED

Disconnect power before removing covers, panels or any grounding straps. Reinstall covers, panels and any grounding straps *before* reconnecting power.

WARNINGS FOR AUTHORIZED SERVICE PERSONNEL

Dangerous voltages exist at several points in this instrument. To avoid personal injury, do not touch exposed connections or components while power is on.

Disconnect power before removing protective panels, soldering, or replacing components.

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INTRODUCTION

This manual contains complete information required to service and repair the Gould RS 3200 and RS 3400 thermal recorders. It is intended to complement the User's Manual, part number MU30-V0202-00 which is supplied with every unit. The separate user's manual contains Sections I, II, III and IV, description, installation, operation and user maintenance, respectively.

This service manual includes a detailed theory of operation, acceptance test, internal calibrations and adjustments, and a complete parts identification section with exploded views. All schematics may be found in Appendix A in the back of this Manual.

Consult the User's Manual for installation and operating instructions, operative and preventive maintenance information, product specifications and other user information.

SECTION I

THEORY OF OPERATION

1.1 INTRODUCTION

All 3000 Series Recorders contain the same or similar modular assemblies. Operational understanding of the various models must be based on the understanding of its basic assemblies. This Theory of Operation is organized to provide assembly level operational descriptions.

Schematics are available in the appendix at the back of this manual.

1.2 CHART DRIVE BOARD 897658

1.2.1 Introduction

The Chart Drive Board (Stepper) is used in all models of the 3000 series to control the stepper motor. Proper operation of this P.C. BD. assembly is necessary for smooth linear paper motion throughout the recorder's operating speeds, .005 mm/sec to 500 mm/sec.

1.2.2 General

The Chart Drive Bd. resides in a dedicated slot of the cardcage, and interfaces to the recorder via the Motherboard backplane connector, J41. It is basically a slave to the Controller Board. The Chart Drive Board controls the stepper motor speed per data loaded into it by the controller. In addition to controlling the stepper motor speed the Chart Dr. Bd. outputs various signals to the system and user to support internal recorder functions and external features.

One of the internal functions of the Chart Drive Bd. is to accept chart drive motion detection signals from the Recorder's optical motion detector, and make a comparison to the programmed chart speed. A "MOTOR STALL" condition can then be detected and displayed to the user via the Controller and Front Panel Display.

Another internal support function is to output signals proportional to chart speed to the thermal Pen Heat Control boards. As the chart speed increases, thermal pen heat increases to maintain high quality thermal writing.

The primary external support function that the Chart Drive Bd. provides is synchronous chart speed operation with an external event or other 3000 Recorder. The user implements this master/slave feature via the "sync in" and "sync out" signals routed through the Controller's Remote connector and Front Panel Keyboard commands.

1.2.3 Description

To accomplish the primary and miscellaneous functions of the Chart Drive, a variety of state of the art circuit techniques are employed. The following discussion breaks the Chart Drive up into functional blocks to help explain it.

Schematic references are made throughout the following discussion. The Chart Drive Board schematic is 297658.

- uP Interface: The micro-processor interface block includes U1, U2, U3, U4, U5, U6 and U9.

  Together these IC's buffer all signals entering and leaving the Chart Drive Board. By buffering these signals reliable operation in noisy environments is guaranteed.

  The other task of the interface block is to generate and qualify the appropriate individual chip selects. The Controller requires these chip selects to support communication with the speed control DAC, PROGRAMMABLE DIVIDER, rewind latch and external operation latch. These chip selects are generated from the Controller's address bits, Chart Drive select signal (chart), and other bus qualifiers.

- DAC & VCO: (chart speed control Digital to Analog Converter & Voltage-Controlled Oscillator). This block includes DAC U10, VCO U37 and operational amplifiers U11 & U12.

  The Controller loads the 12 bit Digital to Analog Converter with digital data proportional to the desired stepper motor speed and desired chart speed. The output span of the DAC and its amplifier is 0.0V to -10.0V which corresponds to its digital data zero to 4000 (base 10).

  The output span of the DAC is input to the Voltage-Controlled Oscillator. A logic level pulse train is generated where at -10.0V input, the output frequency is 80,000 Hz. At the minimum frequency generated, -0.1V input, the output frequency is 800 Hz.

  Due to the variations with the VCO, calibration of this block is necessary. VCO output frequency can be measured at Test point -2 with an averaging frequency counter having a 10:1 probe.

  Zero offset is adjusted at the VCO's amplifier using R27. With minimum chart speed data loaded into the DAC, the output frequency of the VCO should be adjusted to average 800.0 Hz. Gain is adjusted by varying the reference voltage feeding the DAC with R43. With maximum chart speed data loaded into the DAC, output frequency of the VCO should be adjusted to average 80,000 Hz. Because the zero offset adjustment cannot be made with an absolute circuit voltage of zero, these adjustments are interactive and may take several iterations to get right on.

1.2.3 Description (cont.)

- PROGRAMMABLE DIVIDER: This block is composed of U13.

  The PROGRAMMABLE DIVIDER accepts the pulse train input by the VCO and divides it by 2, 120, 200 or 2000, depending on data loaded into the Controller. This DIVIDER performs the Recorder's divide-by function initiated by the Front Panel "divide by" key. It is also the means in which the dynamic range of the chart speed, 100,000:1, is attained. The customer selects the divide-by coefficient of 1, 60, 100 and 1000, with DIP switches on the controller. The controller doubles the coefficient to the Chart Drive Board because the minimum available initial coefficient is 2.

- FULL STEP PHASE CONTROL: This block is composed of a 6 bit binary counter, U14, and a phase controller U15.

  Bipolar stepper motors have 2 stator coils, SINE & COSINE MOTOR COILS, and 1 permanent magnet rotor. To force a stepper motor to rotate, a sequence of 4 flux patterns is generated by the coils. This sequence corresponds to the forced rotor movement of 4 full steps. The sequence repeats to provide continuous rotation.

  To generate 4 flux patterns from a stepper motor having only 2 stator coils, current is forced to flow in a positive and negative direction of each coil. This is what is meant by PHASE CONTROL.

  The phase controller IC is a Programmable Array Logic device which is configured to generate current steering signals for a 4 step sequence. This sequence is with respect to the 6 bit, 0 to 63 base ten, binary counter.

  The binary counter is incremented with every pulse that is fed it by the PROGRAMMABLE DIVIDER. The phase controller generates a new full current steering pattern at 16 count intervals of the binary counter.

- uSTEP WAVEFORM GENERATOR: Following the FULL STEP PHASE CONTROL block, the Chart Drives circuitry divides to independently control the SINE & COSINE STEPPER MOTOR COILS. The SINE & COSINE circuitry is nearly identical with the exception that the motor coil currents are forced to be 90 degrees out of phase.

  uSTEP "SINE" WAVEFORM GENERATOR block is composed of operational amplifier U18, ROM look-up table U19, DAC U21 and timing latch U29. uSTEP "COSINE" WAVEFORM GENERATOR block is composed of operation amplifier U18, ROM look-up table U20, DAC U22 and timing latch U30.

1.2.3 Description (cont.)

To get high resolution and smooth linear motion from the stepper motor, micro-stepping technique is utilized. Micro-stepping is the technique which simply forces a stepper motor to rotate in fractions of full step angular rotation. The 3000 Recorders use a stepper motor having 200 full steps per revolution. The Stepper divides each full step into 16 micro-steps, which allows for 3200 increments of rotation per revolution.

Micro-stepping is accomplished by forcing motor coil currents to flow in a sinusoidal fashion. The SINE & COSINE STEPPER MOTOR COIL currents have the trigonometric phase relationship of their names. STEPPER MOTOR COIL currents closely follow in magnitude to the WAVEFORM GENERATOR outputs.

The uSTEP WAVEFORMS are generated with respect to the binary count fed to ROM based look up tables, the ROM table data feeds a timing latch, which in turn feeds digital to analog converter circuitry. The outputting analog voltage feeds subsequent blocks of circuitry.

The analog to digital conversion circuitry on early revision Chart Dr. assemblies require calibration. The gain circuit adjustment for both branches of circuitry is R42. Adjust potentiometer until the DC voltage at U18 pin 8 equals 6.0V. R42 is not present on later revision assemblies.

- PWM CURRENT LIMIT: Pulse Width Modulation CURRENT LIMIT circuitry, independently controlling both sine and cosine branches, is composed of the digital frequency divider U24, set of voltage comparators U33, and set of PWM control latches U26.

  The frequency divider generates a 31,500 Hz square wave from the 1,000,000 Hz "E clock" system signal. The PWM control latches use the 31,500 Hz frequency as a "set" command. When a control latch is "set", the H BRIDGE POWER AMP block is commanded to force current through the appropriate STEPPER MOTOR COIL.

  A control latch is reset with the voltage comparator, receiving inputs from the uStep WAVEFORM GENERATOR block and the CURRENT SENSE FEEDBACK AMP block. When the feedback voltage exceeds the reference voltage, the control latch is reset and the H BRIDGE POWER AMP block is commanded to cease current flow through the appropriate STEPPER MOTOR COIL.

- H BRIDGE POWER AMP: The sine branch POWER AMP consists of NAND gating U28, intermediate totem pole drivers U39, U42 & U43, MOSFET driver set U45 and current re-circulating diodes CR6, CR7, CR8 and CR9. The cosine branch POWER AMP consists of NAND gating U28, intermediate totem pole drivers U40, U42 & U44, MOSFET driver set U46 and current re-circulating diodes CR10, CR11, CR12 and CR13.

1.2.3 Description (cont.)

The NAND gating accepts phase control signals from the FULL STEP PHASE CONTROL block and current limit signals from the PWM CURRENT LIMIT block. Per these inputs NAND gating drives the totem pole drivers which in turn drive the MOSFET drivers. The MOSFET's are driven in pairs to control which direction current is forced through the STEPPER MOTOR COILS, and Pulse Width Modulated to limit the current to the desired average level.

Current re-circulating diodes are incorporated in the circuit to steer the decaying STEPPER MOTOR COIL currents during the H BRIDGE off times back into the power supplies. The resulting overall power savings is considerable.

- CURRENT SENSE FEEDBACK AMP: The sine and cosine branch FEEDBACK AMPS are independently composed of sets of operational amplifiers U35 & U38.

Power feeding each H BRIDGE POWER AMP block is sensed via a 0.1 ohm resistor, then differentially amplified, then amplitude amplified, then rectified and finally filtered. As previously mentioned, this block feeds the PWM CURRENT LIMIT block.

1.3 MOTHER BOARD 897650, 897651 & 897517

1.3.1 Introduction

This set of mother board assemblies is used in the 3000 recorder product line. These boards act as a backplane to the cardcage portion of the recorders.

The 897650 supports the 2 channel frame size cardcage.
The 897651 supports the 4 channel frame size cardcage.
The 897517 supports the 8 channel frame size cardcage.

1.3.2 General

These boards provide the signal paths and will tie together all of the primary electronic assemblies of the recorder. These boards only pass signals; they are passive assemblies having no active components.

1.3.3 Description

The mother boards in conjunction with the mother-in-law boards tie together all the primary and secondary electronic assemblies of the recorder.

System schematic diagrams and mother schematic diagrams clearly illustrate the who's, what's and where's of all connections.

1.3 MOTHERBOARDS 897650, 897651 & 897517

1.3.3 Description (cont.)

The 2 channel frame size mother schematic is 297650.
The 4 channel frame size mother schematic is 297651.
The 8 channel frame size mother schematic is 297517.

1.4 MOTHER-IN-LAW's, 897811-1, 897812-1 & 897813-1

1.4.1 Introduction

This set of Mother-in-Law (MIL) and assemblies is used in the 3000 recorder product line. These boards act to interconnect most of the electronic assemblies located in the transport half of the recorder.

The 897811-1 supports the 2 channel frame size Transport Assembly.
The 897812-1 supports the 4 channel frame size Transport Assembly.
The 897813-1 supports the 8 channel frame size Transport Assembly.

1.4.2 General

These boards provide a signal path and ultimately tie together all of the secondary electronic assemblies of the recorder. Signals that need to interface to the recorder's primary electronic assemblies are grouped and travel to the cardcage half of the recorder via mass termination ribbon cable assemblies.

Aside from interconnecting assemblies, these MIL's provide coil drivers for the inner-channel event markers.
By providing these drivers, the number of high current paths running between the cardcage and transport assemblies is minimized.

The similarity between the MIL assemblies is considerable. The 2 channel MIL is a subset of the 4 channel. The 4 channel MIL is a subset of the 8 channel.

1.4.3 Description

The MIL assemblies, in conjunction with the mother boards, tie together all the secondary and primary electronic assemblies of the recorder.

System schematic diagrams and MIL schematic diagrams clearly illustrate the who's, what's and where's of all bussed signals.

The 2 channel MIL schematic is 297811.
The 4 channel MIL schematic is 297812.
The 8 channel MIL schematic is 297813.

1.5 DUMMY INTERFACE CL-810312

The Interface Assembly standard to the 3000 recorder product line resides in a dedicated slot, J43, of the recorder's card cage.

Via its "preamp connector", digital data and analog signals are interfaced between the recorder and 5900 preamp cardcage. Preamp definition and configuration data, printed out on the recorder's optional inner-channel annotation heads, takes this path.

The Standard Interface also connects all analog signal grounds to the recorder's signal common. This grounding path is required on all models, regardless of preamp configuration.

1.6 +/- 15V POWER SUPPLIES 497867

The majority of power consumed within the recorders is supplied from the +/- 15v supplies. The rate of consumption will vary depending on the operating frequency and amplitude of the penmotors. Nearly every electronic assembly within the recorder consumes at least a little power from these supplies.

The dual supply that provides this power is used across the product line. They are designed in such a way that they can be paralleled. Two and three identical supplies are installed in parallel in the larger model Recorders. They reside in dedicated slots within the recorder's cardcage. The actual number of required supplies will depend on the recorder's frame size, configuration and installed options, and not necessarily on the number of available dedicated slots.

An additional benefit of the supplies is that when operating in parallel they are designed to share their load evenly. This promotes a cool operation, which in turn promotes long life.

1.7 SERVO PEN DRIVE AMPLIFIER 897406

1.7.1 Introduction

This circuit board consists of two identical amplifier channels, plus a few common components associated with the digital controlled pen position, pen polarity and power output enabling circuitry.

1.7.2 Description

Each amplifier channel utilizes three proprietary modules with the following functions:

1.7.2.1 Oscillator / Demodulator Module 297498 (U2)

This module contains a 20 KHz sine and square wave source, a linear phase-sensitive demodulator, a filter and a buffer amplifier. This module supplies excitation for the Metrisite position sensor built into the penmotor and demodulates the Metrisite AC output into a DC position signal using a filter and buffer amplifier.

1.7.2.2 Servo Control Module 297499 (U1)

An external dip switch controlled attenuator accommodates +1, +2.5 or +5 volt signal inputs to the control module. This signal is summed in an operational amplifier with an external +5 volt pen positioning signal and fed to a limiter circuit which electronically stops the input "command" signal from driving the pen into the mechanical pen stops.

This limited input signal is modified by adding an adjustable portion of a velocity signal from the penmotor and a derived pen acceleration signal. In addition, an adjustable compensation network is used to modify the amplitude of the input signal as a function of signal frequency.

Finally, this modified input signal is compared to the DC position signal derived from the penmotor Metrisite sensor. The resulting + or - difference signal is used to modulate the on-time of a 20 KHz square wave. The resulting output can vary from zero to 100% on-time. The output signal has a value of +10 volts for a small error signal of one polarity and -10 volts if the error is of the opposite polarity.

As the error gets still smaller, the output becomes a voltage which switches between +10 volts at a 20 KHz rate. At zero error between the modified input signal and the feedback position signal from the Metrisite, the output is 50% on-time square wave at TP-5.

The U1 module also includes circuitry which monitors the amplitude of the sine wave which excites the Metrisite. The purpose is to disable the output stage in the third module if the 20 KHz oscillator fails. (If the feedback signal goes to zero, the pen position is unknown and the amplifier output goes full on.)

The disable output also drives the command input signal to zero on a normal "stop" signal from the recorder's controller, which causes the pen to center on the chart; the output is then disabled to make the pen go limp.

One more feature of this module is a circuit to provide a buffered output for tape or other monitor. This "monitor" output can be polarity reversed with the dip switch on the 897406 board.

1.7.2.3 Power Output Module CL-810380 (U3)

This circuit includes the drivers and Hybrid "H" Bridge, a MOSFET switching circuit (which alternately connects the penmotor drive coil from +15 to -15 volts, reversing the drive at a 20 KHz rate). Due to the inductance of the drive coil, only a tiny current has time to build up on each polarity reversal. The average current is zero, if a 50% square wave is impressed. If, however, the waveform becomes asymmetrical, appreciable currents of up to 2.5 amperes will flow through the 10 ohm penmotor. Since the power reversing switches are very low resistance when conducting (0.2 ohms) and open circuit otherwise with the square wave drive, very little power is actually dissipated in the MOSFET switches and the circuit efficiency is high. In addition, control is very linear through the zero average current condition, so that pen hysteresis (lack of pen stiffness) at crossover is overcome.

Also in this module is a MOSFET switch which disconnects the negative supply to the Hybrid bridge when the U1 module zeros the Enable input to the output module. It includes a time constant which works with the FET clamp Q1 in the 297499 module to make the pens zero center before losing power on "STOP".

1.7.2.4 Power Supply Circuits

Each channel on the Pen Servo board has its own +12 and -12 volt regulated supply for the low level circuitry. Both +12 volt supplies power the 5 volt regulator used for powering the digital circuitry.

This separate regulation insures against interaction between channels.

Circuit breakers are used to protect the individual penmotors from extended overloading or affecting all channels by shorting the system power supplies. They only protect the output modules.

1.7.2.5 Digital Circuitry

Individual 12 bit digital to analog converters (AU4 and BU4) are addressed by 4 bit bytes from the system controller. Their outputs supply 0 to +5 volt signals to operational amplifiers (AU5 & BU5). The amplifiers level shift and double the output to the -5 to +5 volt level required by the Servo Control module pen position input.

1.7.2.5 Digital Circuitry (cont.)

Digital chip U8, also is addressed by the system controller. Its four outputs are individually selected by the two input bits applied to board terminals 22 and 23 and the strobe on pin 15. Latches (U9) turn on and off relay K1A or K1B and control the pen polarity of channels "A" and "B". These latches can be "reset" to an initial condition via the system reset on board input pin 27.

The other two outputs of U8 enable the A channel or B channel D/A converter when a change in the pen position is requested via the control panel push buttons. U5 converts the 0 to +5 volt output of the D/A to +5 volts to swing the pen position through full scale chart deflection.

Transistor Q10 is used to ground the channel enable (pin 10 of U1) of both channel A and B. Both channels disable when board pin 26 is at +5 volts.

1.7.2.6 Miscellaneous

Super stable amplifiers AU11 and BU11 amplify the filtered velocity signals from the penmotor velocity coils by a factor of 6 and are used only with Thermal writing recorders. Trim potentiometers AR40 and BR40 are used to adjust the offset of these amplifiers to compensate for DC errors at the pen heat control circuit board which cause the trace darkness to differ depending on the direction of pen travel.

The 20 KHz "Sync" signal input is essential on multi-channel 3000 series recorders to prevent tiny magnetic leakage fields between penmotors from causing audible, and sometimes, visible pen modulation (beating) at the different frequencies. A small portion of a crystal controlled 20 KHz derived from the micro-processor 1 MHz clock is fed to each U2 chip pin 16 from a Motherboard bus on pin 88. This signal locks all channel oscillators to exactly 20 KHz eliminating the beat frequencies which would affect "span" calibration. (Note: Copper shields are used between penmotors to curb flux leakage.)

R6, labeled "Sq. Wave Comp.", is used to center the pen in the channel to compensate for mechanical offsets in the chart paper location and pen linkage/Metrisite tolerances. The electronic limiter adjustments may run out of adjustments range and the linearity suffer if R6 is not preset within one or two chart divisions at calibration with the pen position input zeroed.

1.8 +5V POWER SUPPLY 897515

1.8.1 Introduction

This assembly is used in all 3000 recorders. It resides in a dedicated slot, J31, in the recorder's cardcage.

1.8.2 Description

Aside from providing +5 volt power, 30 watts, for all the recorders logic circuitry, several other functions are provided. They are as follows:

1. Fuse and switch the A.C. line power for the recorder.

2. Provide input line filtering. Line filtering is a primary concern when extending the operating frequency of the recorder to 47-440 Hz. Both the power supplies and the line filter will physically handle high frequency operation, but at 400 Hz the line filter's leakage current exceeds the 500 micro-ampere safety limit set down by U.L. and I.E.C.. To operate the recorder at 400 Hz one must either accept 2 milli-ampere common mode leakage @ 120 VAC line, or specify a different line filter. Note: Common mode interference rejection is reduced as leakage current is restricted.

3. Provide user configurable, input line voltage selection via the voltage selection PCB card. The selected voltage is visible through the back panel window. The nominal voltage selection choices are 100 VAC, 120 VAC and 240 VAC. Functionally, the voltage selection card routes the A.C. line power to the +/- 15V supplies, the on-board +5V supply and the 13 VAC isolation transformer (used only in the 2 & 4 channel frame size models).

C A U T I O N:

All the recorder's power supplies will fail if the recorder is configured for 100 VAC or 120 VAC and the user inputs 220 VAC or 240 VAC.

4. Battery backup power stored in the battery holder is a AA 3.5 volt lithium cell, used to retain continuous accuracy of the Controller's real time clock.

5. The on-board Direct Current to Alternating Current voltage converter, U1, is used to provide dedicated power for the Vacuum Fluorescent Display used by the front panel.

6. Cardcage fan speed control is accomplished by a temperature actuated reed relay. Fan speed is switched from low speed to high speed when cardcage temperature reaches 40 degrees centigrade. The purpose of fan speed control is to limit fan noise.

7. A 20 KHz servo amplifier sync signal is generated and output to the servo amplifiers to synchronize the servo motor chopper circuitry. This accomplishes quiet pen motor operation.

1.9 CONTROLLER 897637

1.9.1 Introduction

The Controller Board is the heart of the unit. This board processes all the internal and external information to the unit. The 6809 microprocessor (uP) on the Controller Board has the ability to "talk" to every circuit board in the unit. It does this via the data bus (D7-D0) and the chip and board select signals (PAPER, CHART, INFCE, etc..). Through inquiry to these boards, the processor can determine such things as which button was pressed, what command was sent over the interface, how much paper is left in the unit, and other pieces of recorder data.

1.9.2 Description

The processor system consists of the 6809 microprocessor (U1), data bus driver (U4), address bus and control signal driver (U3), and master clock oscillator (Y1). The 6809 controls virtually all of the recorder functions through the execution of the control program which resides in EPROM (U9). The other sections of this board are the address decode circuitry, real time clock, memory, interrupt logic, event/timer marker logic, standard annotation head logic and driver, watchdog timer for both annotation head and microprocessor operation, remote connector logic, preamp communication logic, and trigger level circuitry.

Address decode circuitry consists of the address decoders (U5, U6, U7, U43) and the gating to create the valid read enable, valid write enable, and valid memory address (VRE-, VWE-, WMA-) signals (U15, U16, U17, U32).

The Real Time Clock consists of U11, Y2, C2, C3, Q2 and R10. Each digit is individually addressable by the microprocessor and can be changed. Backup voltage is supplied by a "AA" size battery located on the +5v Power Supply board (P/N 897515) through J1-60.

The memory on this board consists of 512 bytes of non-volatile RAM (NovRAM U10) and 2K bytes of CMOS RAM (U40). All control settings, test numbers, run times, pen positions, user messages, pen polarities, etc.., are stored in this NovRAM. Upon power up, the uP reads the cold start/warm start switch (SW1-1). If in cold start, the uP will fill the NovRAM with default information and values. If in warm start, the uP will do a non-volatile recall of the NovRAM and use the last saved set of conditions from when the recorder was powered down to set up the recorder. In this way, the recorder will power up exactly as it was powered down previously. The CMOS RAM is used to store inter-channel messages, preamp status and as a general scratch pad memory.

The Interrupt Buffer and Logic (U26 and U27) allow a means for the other boards in the unit to communicate with the uP. All the incoming interrupts are gated together using U26. A LOW on any line will generate an IRQ- to the uP. The uP reads the buffer at U27 and, using the byte read, determines the interrupting device.

1.9.2 Description (cont.)

The Event/Timer Marker logic consists of 2/3 of U12, U13, U14 and U17. One timer on U12 counts a uP programmed number of 1 MHz E-clock pulses. On reaching this number, it issues a pulse to another timer on U12 which actually creates the timer pulse. This pulse deflects the timer marker in the desired direction in accordance with the steering logic of U13. U13's job is to determine when to direct the tenth pulse to the right event coil rather than the left coil. In this way we get our bi-directional timer marks. U14 and U17 allow LEFT MARK and RIGHT MARK from the front panel as well as R EVENT and L EVENT from the REMOTE connector to be gated in with the timer marks.

The Standard Annotation Head logic and driver consists of the other 1/3 of U12, U19 and U20. Upon receiving an interrupt from the Chart Drive board (via J1-32 to U39A, pulling down the FIRQ- line), the uP will write the next raster of data to be printed on the standard annotation head to the latch which is U19. This also triggers the countdown timer on U13 which counts a pre-programmed number of 1 MHz (1 ms) pulses (which is a function of the present chart speed) and then issues a CLR- pulse to U19. The Darlington drivers in U20 pull down on the elements to be printed for that amount of time.

The Watchdog Timer circuit is essentially a two-fold operative circuit. It monitors both annotation head on time and uP memory access frequency. First, the act of writing to the annotation head latch (U19) also triggers the annotation head watchdog by toggling U36A (a D-type F/F wired as a T-type). This allows Q-clock pulses to be counted by U37. If U37 counts 1024+512=1536 pulses (or usec) before getting a CLR+ pulse via U15-6 (which is initiated by the same CLR- pulse from U13 that clears U19), U15-3 goes low and is clocked over to the RESET line via U36B and U32. The processor is reset along with the annotation latch and the head is saved from burning out. Second, should the uP NOT access the program memory (U9) at least once in a 50 usec period (signified by CODE- going low, thus clocking U35A), a RESET will be issued via U35B-5 and U32.

The Remote Connector buffer provides an input port for remote connector inputs (S2-, S1-, S0-, D1-, D0- & REMOTE-). By monitoring these signals when REMOTE- is pulled low, the uP can make the recorder run at the speeds specified by the speed and divide-by bits. Speeds are per the table on the following page:

1.9.2 Description (cont.)

S2-	S1-	S0-	Base Speed Selected
0	0	0	500 mm/sec
0	0	1	250 mm/sec
0	1	0	100 mm/sec
0	1	1	50 mm/sec
1	0	0	25 mm/sec
1	0	1	10 mm/sec
1	1	0	5 mm/sec
1	1	1	EXTERNAL

D1-	D0-	Divisor Selected
0	0	/100
0	1	/60
1	0	/1000
1	1	/1

The Preamp communications logic (U39B, U42, U43) allows the uP to communicate with the Interpreter board in order to obtain preamp status information for inter-channel annotation or, in the cases of 3200 and 3400 chassis, to pass commands to the preamps which are received via the recorder's RS-232 or IEEE-488 interface. When the uP writes to the Interpreter through bi-directional U42, it generates an interrupt to the Interpreter. The uP monitors this line until it goes high again, indicating the Interpreter has taken the byte. The uP then is able to write the next byte of data. This process works in reverse when the Interpreter talks to the uP on this Controller board.

The Trigger Level Circuit (U8, U25, U28 & U29) functions as an amplitude triggering circuit. After a trigger level is set and entered using the pen position controls for channel 1 as outlined in the User's Manual, this level is written to U25. U25 works in conjunction with U28, creates an analog level corresponding to this code and presents it to the comparator (U29). When the analog level at U29-3 exceeds this TRIGGER level, an interrupt is generated by U8 to the uP IRQ line. The greater than/less than status of the trigger level is monitored by the processor via U41-13 on D5.

1.10 KEYBOARD 897843-1, -2, 897844-1, -2, -3, 897783 and CL-810186

1.10.1 Introduction

The Keyboard is responsible for the Vacumn Florescent Display (VFD) drive, and keyboard data entry.

Refer to following Schematic Diagrams:

RS 3200	297843
RS 3400	297844
RS 3600	CL-210186
RS 3800	297783

1.10.2 Description

The main keyboard is scanned by U2 which also controls U3 and uses it to help in this scan. When a key is pressed, U2 detects the short and, after 1 10 ms debounce, confirms the depression. It creates the unique code for that particular key and generates an IRQ- interrupt to the Controller Board via U4. The Controller (P/N 897637) can then read this code using U1 and U9 to create the proper strobes. U2 has an 8 byte memory for key press storage and is RESET on power-up and whenever the STOP key is pressed.

The Pen Position keypad is scanned by U7 in much the same manner as U2 scans the main keyboard. However, the line which generates the IRQ- interrupt to the Controller from U7 stays low as long as a pen position key is being held depressed. In this way, the Controller uP can monitor the length of time a pen position key has been pressed and move that pen faster the longer the key is held down.

The VFD is driven by U10, U11, U12, U13 and U14. The uP on the Controller Board sends the 5x7 bit pattern of the data to be displayed to U10 (which is cascaded to U11 and U12). After this data is sent, the bit pattern for turning "ON" the proper anode for this particular character is sent to U13 (which is also cascaded to U14). When all information is fed to these chips, the Controller issues the LATCH commands (BLATCH AND GLATCH) which displays this data as an ASCII character. The entire process is then repeated for the next characters until the entire 16 character message is displayed. This entire process is repeated as long as the message is to appear in the display.

1.11 PAPER SUPPLY/INTERLOCK/MOTION SENSORS

1.11.1 Introduction

The 3000 Recorder incorporates photo-sensors to measure the remaining supply of chart paper and detect a paper out condition.

1.11 PAPER SUPPLY/INTERLOCK/MOTION SENSORS

1.11.2 Paper Remaining Sensors

There are five reflective photo-sensors mounted on a PC board behind the metal plate on the left side wall of the 3000 paper compartment. These sensors view the left end of the supply roll of chart paper (or the left end of a stack of paper) in the compartment. Each sensor contains both a source of infrared light and a photo detector.

The five sensors are located in an inverted "L" pattern so that they work for both fan-fold and roll paper and sense the presence of the white edge of the paper roll or stack. The vertical row of sensors views the height of the fan-fold stack and the horizontal row of sensors views the diameter of the roll paper.

The present controller software only makes use of the end two sensors on each leg to determine three conditions of paper supplying remaining. If both sensors are "seeing paper", the controller will cause the panel display to read "SUPPLY = 100% - 50%". If only the end sensor "sees" reflected IR light, the panel display reads "SUPPLY = 50% - 25%". When no sensor receives reflected IR light the display will read "SUPPLY = 25% - 0%".

The sensors are NPN photo-transistors which are high resistance for dark condition and low resistance for the illuminated condition. Approximate operating distance for the sensors is .12 to .3 inches. Each signal is buffered separately by U4 located on the 897635 Paper Supply board and sent to the controller via the Mother-in-Law board and backplane circuits. Sensors are paralleled for the fan-fold and roll functions.

1.11.3 Paper Out Sensor Board (Refer to Circuit Diagram CL-210240 & 297912)

The CL-810240 board is mounted to the left side plate on a small bracket just above the top left edge of the recorder's writing table - just before the paper reaches the top roller.

Its purpose is to send an interrupt to the recorders controller and shut the system down before the paper end reaches the pens or Annotation Head. These items may be damaged by overheating, in the case of Thermal recorders, or damage the rubber roller on which they write. The interrupt generated shuts down the pen heat system as well as the chart drive. It will also sense gross mis-threading of the chart paper.

The "Paper Out" sensor incorporates a transistor current amplifier to increase its sensitivity distance to .12 to .5 inches. The sensor still acts as a varying resistor and is connected in series with the "Table Open" sensor. Either sensor, deprived of a reflected signal will cause U4 on the 897635 Paper Supply board, which buffers this interrupt signal, to pass it on to the Mother-in-Law backplane board where it goes to the controller bus.

1.11 PAPER SUPPLY/INTERLOCK/MOTION SENSORS

1.11.4 "Table Open" Detection (Part of Cable Assembly 897912)

A reflective sensor views the bottom left edge of the writing table as it swings into the operating position. Since the photocell is in series with the Paper Out sensor it also prevents the annotation head(s) and pens from writing and the chart drive from operating by generating a system interrupt.

1.11.5 Speed Monitor Board (Schematic Diagram CL-210290)

Attached to a shaft driven by the stepper motor is a transparent disk with an opaque mark every 3 degrees of rotation on its outside edge. The edge of the disk moves in the gap of an "interrupter sensor" which has an infrared source on one side and a photo sensor with a .010 x .020 inch viewing area. For every .014 inch of chart paper movement the sensor sees one light pulse and uses a Schmitt trigger circuit to square up the waveform.

NOTE:

The Mother-in-Law board supplies the pull-up resistor required on Board P/N CL-810290.

This sensor serves two functions:

a. It is a stepper motor "stall" detector used by the controller -- if the motor is supposed to be stepping and these pulses do not occur, the controller microprocessor is programmed to recognize this condition and it will attempt to ramp the motor up to speed three times before displaying a "stall" error message. A broken belt or loose motor pulley will also be detected.

b. It serves as an "arming trigger" for the annotation head "write" function. Unless one or more pulses occur between the last write command and the time when the head is supposed to write again, the paper has not moved under the head and write commands are inhibited. Annotation heads write each .016 inch of paper (32 motor micro steps). If heads write too often, overheating and damage may occur.

1.12 INTERCHANNEL ANNOTATION CL-810191

1.12.1 Introduction

The Interchannel Annotation Driver board is the board which drives the interchannel annotation heads. This board is required if interchannel annotation is desired in either ink or thermal units. Each board will support two (2) interchannel annotation heads.

1.12.2 Description

The microprocessor on the Controller Board (P/N 897637) writes the raster of interchannel annotation data to be printed for a particular channel to the proper octal latch (U1 and/or U2) on the interchannel annotation driver board. The outputs of these latches enable Darlington drivers U3 and U4 which pull the proper elements of the heads in question to approximately +1.5v thus creating the marks on the paper as needed. After printing for a programmed amount of time, which is a function of present chart speed, the uP on the Controller board then clears latches (U1 & U2) to prepare for the next raster to be printed.

Since the heads come in three basic grades (A, B & C), the voltage across them becomes a function of the head power efficiency. Diodes (CR2, CR3, CR4 & CR5) are voltage dropping diodes either put in series with or shorted out of the power line. The flex cables are punched with holes according to the head grade which opens connections to these diodes. In this manner, any grade head can be used with any driver.

CALIBRATION

2.1 INTRODUCTION

This section provides the performance test, mechanical adjustments and electrical calibration procedures for the Gould 3200 and 3400 Ink Recorders. The performance verification test compares the recorder's performance to its specifications. The performance test is recommended as an acceptance test when the unit is first received, and later as a verification of the recorder's accuracy at scheduled calibration periods. It is recommended that the performance test be run and the results recorded prior to attempting any electrical calibration of the unit. The calibration procedure should be performed after repair of the recorder and/or when the unit fails the performance test. If the recorder will not respond to, or meet the limits of the calibration procedure, repair is indicated. e recorder must be allowed to warm-up for at least 15 minutes before starting the performance verification test or the calibration procedure.

2.2 EQUIPMENT REQUIRED

a. Gram Gauges for 0 to 50 and 0 to 150 ranges
b. D.C. Calibration Source
c. Function Generator
d. 3.5 digit DVM
e. Oscilloscope
f. Frequency Counter - Fluke Frequency Counter model 1953A or equivalent averaging type high resolution frequency counter or (Gould oscope Model 3150 with built-in freq. counter).
g. Remote input connector - Gould Part No. 244550-37, supplied with recorder
h. Signal input connector - Gould Part No. 245537-37, supplied with recorder
i. Annotation head "Alignment Gauge" Gould #CL-211327 (.010" feeler gauge)
j. Extender card - Gould part No. CL-210472
k. Meterstick
l. Multiple spline wrench - Gould Part No. 1-120922-2
m. Analog Voltmeter
n. Four - 100Ω, 1 watt, 5% resistors

NOTE:

Allowed the recorder to warm-up for at least 15 minutes before starting the performance verification test or the calibration procedure.

2.3 MECHANICAL/VISUAL INSPECTION

2.3.1 Before Power-Up

Check for obvious defects such as loose hardware or handling damage. Inspect push buttons for alignment, nomenclature and non-binding operation, sliding pushbutton covers for smooth operation.

Check orientation of line voltage selector (View thru opening on the 5 volt supply - below line cord).

Inspect for free movement of annotation arm(s), on to the writing table. They should be spring loaded toward the table silicone roller at 100 grams pressure.

2.3 MECHANICAL/VISUAL INSPECTION

2.3.1 Before Power-Up (cont.)

Inspect for free movement of annotation arm(s), on to the writing table. They should be spring loaded toward the table silicone roller at 100 grams pressure.

2.3.2 Power Off - Chart Paper tracking Stabilized

Check pen tip at the center of its channel for proper length. All pen tips should write within 1/2 mm of each other and parallel to the chart time lines within 1/8 mm total skew. Then check for pen "skew" (a variation from the proper time line as the pen tip is moved manually to the left and right extremes of its channel.

Check pen pressures to be 30 +/- 5 gm for thermal analog pens. Also, 30 gms +/- 5 for event pen(s). Measure with spring gauge hook at pen tip held at 90 degrees to the paper surface.

Check mechanical pen stops by manually moving each analog pen to its right and left mechanical limits to assure the pen tip excursion is 2.0 to 2.5 mm beyond the chart edge. Exception is channel 1 left edge which should be at least 1 mm beyond edge.

Check each event marker pen tip for alignment on chart event "ladder" printed on the chart paper. Mechanically, the base of the marker assembly is squared to the "Bumper strip", on the recorder. The pen is turned to center the pen tip on the chart event "ladder" by loosening the two #0 screws securing the pen to its mounting. Event pens deflect left and right and should be adjusted within 0.1 mm of "latter" center after the paper tracking has stabilized. All event markers are to be tested for proper 1 to 1.5 mm deflection and operation after power is applied via the TTL inputs on the remote connector.

2.4 PERFORMANCE TEST PROCEDURE

2.4.1 General

The following performance test systematically checks each function of the recorder. The performance test can be run completely as an acceptance test or partially if certain functions are in question. To ensure optimum results, the performance test should be conducted at an ambient temperature between 20 to 30 degrees Centigrade, with relative humidity of less than 70%. If the recorder has been brought indoors from the cold allow it to completely warm to ambient temperature before applying power.

2.4.2 Preliminary

Install chart paper in the recorder, refer to Section IV of the 3000 User's manual for details on paper loading.

Set rear panel switches as follows: (Toward the PC board is ON)

Servo boards:
SW position 3 ON SW positions 1, 2, 4, 5, & 6 OFF

Controller board:
SW positions 2 OFF SW positions 1, 3 & 4 ON

2.4.2 Preliminary (cont.)

Cold start the recorder by turning power switch on, Display will read "CHECKSUM= " with a 4 digit hexidecimal number following equal sign.

Turn power switch off and set position 1 of the Controller board to OFF. Turn power switch on, Display should read "STOP".

2.4.3 Front Panel Controls

Press "5" button. Chart will run at 5 mm/sec and display reads "5 MM/S".

Press "10" button. Chart will run at 10 mm/sec and display reads "10 MM/S".

Press "25" button. Chart will run at 25 mm/sec and display reads "25 MM/S".

Press "50" button. Chart will run at 50 mm/sec and display reads "50 MM/S".

Press "100" button. Chart will run at 100 mm/sec and display reads "100 MM/S".

Press "250" button. Chart will run at 250 mm/sec and display reads "250 MM/S".

Press "500" button. Chart will run at 500 mm/sec and display reads "500 MM/S".

Press "STOP" button. Recorder should decelerate to STOP. Display reads "STOP".

NOTE:

In the following keypad tests, each time the "SET" button is pushed, the display will indicate "FUNCTION TO SET?". If you desire not to set a function after the key is pushed, depress the "STOP" key.

2.4.4 Var Speed

Depress the "SET" pushbutton.

Depress the "CHART SPEED" function key.

Enter "15 MM/S" by pressing the "1" and "5" keys on the numeric keypad.

Depress the "ENTER" function key.

Depress the "VAR SPEED" pushbutton on the top level controls. Recorder should run at 15 MM/S.

Repeat above steps entering 135 mm/sec instead of 15 mm/sec.

Press "STOP" to stop the recorder.

2.4.5 Date

Depress the "SET" mode button.

Depress the "DATE" mode button. The display will read "DD-MMM-YY".

Enter the date from left to right in Day, Month, and Year format using the keypad. The shift key does not have to be used.
Example: "01","JAN","88"

Depress "ENTER" function key.

2.4.6 Time

Depress the "SET" mode button.

Depress the "TIME" mode button. The display will read "HH:MM:SS".

Enter the desired hours, minutes and seconds from left to right using the keypad. The shift key does not have to be used.

Depress "ENTER".

Depress the "TIME" button and verify on the display that the time is correct and the clock is running.

Depress the "DATE" button and verify on the display that the date is correct.

2.4.7 Pen Position Check

Run the recorder at 5 mm/sec. On channel 1, push and hold the left pen position button. The pen should move to the left, slowly for a few seconds then at a faster velocity as long as the button is held.

Push and hold the right position button. The pen should move to the right, slowly for a few seconds then at a faster velocity as long as the button is held.

Position the pen to the center of the chart. Each short push will move the pen only a small amount for precise settings.

Repeat for all analog channels.

2.4.8 Trigger Level

NOTE:

RUN TIME & CHART SPEED must accompany the trigger level setting. RUN TIME is the length of time that the programmed chart speed is to run after the SET TRIGGER is exceeded. The run time can be set between 00-99 seconds. The trigger level input is pin 31 of the remote control connector on the controller board.

Set the recorder to "STOP". Apply a ground (0V) to pin 31 on the remote connector. Both pins 29 and 30 are common.

Depress the "SET" pushbutton.

Depress the "CHART SPEED" pushbutton.

Enter 15 mm/sec by pressing the "1" and "5" buttons

Depress the "ENTER" button.

Depress the "SET" button.

Depress the "RUN TIME" button.

Enter 5 seconds by pressing the "5" key.

Depress the "ENTER" key.

Run the chart at 5 mm/sec and depress the "SET" button".

Now depress the "TRIGGER LEVEL" button. Using the pen position control buttons for channel 1, position the trace to 10 divisions left of chart center in channel 1.

Depress "ENTER" button. The position will be stored and the trace will return to its original postion on the chart.

Depress "STOP".

Connect the + terminal of a variable DC supply (0-5) to Channel ONE analog input (+) and to pin 31 (-) on the remote connector. Connect the - terminal to Channel ONE common and to pin 29 or 30. Set for 0V.

Run the chart at 5 mm/sec. Toggle the "TRIG LEVEL" button several times and note message "TRIGGER OFF" AND "TRIGGER ON" will be displayed. Leave in "TRIGGER ON".

With chart running, slowly increase the DC input voltage. When the input voltage reaches 10 $\pm$ 1 divisions left of chart center, the recorder will run at 15 mm/sec. Immediately reduce the input voltage to 0V. After 5 seconds the chart will revert back to 5 mm/sec. Accuracy of trigger level voltage is apx. 10%.

Retrigger the unit and leave the voltage applied. Note the chart will continue to run at 15 mm/sec as long as the level exceeds 10 divisions. Set the level to 0V and the recorder will revert to 5 mm/sec.

2.4.9 Event Timer

Depress the "SET" button.

Press the "EVENT TIMER" several times, noting that the display will indicate various settings plus TIMER OFF. Check that the following settings appear: .1 Second, 1 second, 10 seconds, 100 seconds, .01 minutes, .1 minutes, 1 minute TIMER OFF. Stop at setting of 1 SECOND and press" ENTER" to lock 1 second timing marks into memory.

With the recorder running at 5 mm/sec ensure that the right event marker operates at the setting entered.

Press "SET" then "EVENT TIMER" several times until "TIMER OFF" appears. Then press "ENTER" and note the timer stops. Stop the recorder.

2.4.10 Rewind

Press "REWIND" and note that the message "OPEN TABLE FIRST" appears in the display.

Gently open the writing table making sure pens are not caught on the paper. Also note that "INTERLOCK" message will appear in the display.

Depress the "REWIND" button. The chart roll should rewind at 50 mm/sec for about 6 seconds and stop.

Close the table and run several feet of paper out at about 50 mm/sec to re-center the paper on the table. Press "STOP".

2.4.11 Test Number

Depress ""SET" button.

Depress "TEST NO" button.

Enter 84 by pressing the "8" and the "4" buttons on the keypad.

Depress "ENTER".

2.4.12 User Message

Depress the "TEXT" pushbutton. The display should indicate USER MESSAGE >. Please note that pressing the "TEXT" key will erase contents of the message buffer. The buffer has a capacity of 256 characters.

Depress the "SHIFT" pushbutton to obtain the status of letters or numbers. The display should indicate "SHIFT ON" or "SHIFT OFF" depending on the status. Each push of the "SHIFT" key will change the status. With "SHIFT ON" all 26 letters of the alphabet can be entered (indicated in blue on the keypad). With "SHIFT OFF" the numeric key pad 1 thru 0 plus the period are enabled. The SPACE is effective in both modes.

2.4.12 User Message (cont.)

Enter the following message: ABCDEFGHIJKLMNOPQRSTUVWXYZ 1234567890.@@ The "@" is obtained by pressing "TEXT" key (in the "SHIFT ON" mode).

Depress the "DELETE" key and note one "@" is erased.

Depress "ENTER" to enter the message into memory.

2.4.13 Status Check

Toggle the "PRINT" key several times and note the display indicates "ENABLE ANNOTATION" and "DISABLE ANNOTATION". Leave in "ENABLE ANNOTATION".

With the Chart Stopped, depress the "STATUS" button. The display will indicate, in succession, the status of the recorder as follows: "ANNOTATION ON; TIME ON; DATE ON; STOP ON; TEST# 84 ON; MESSAGE< ABCDEFGHIJKLMNOPQRSTUVWXYZ 1234567890.@ MESSAGE ON; followed by STOP".

2.4.14 Amp Print Check

With no amplifiers installed, depress the "AMP PRINT" button.

The display should indicate "AMPS UNAVAILABLE".

2.4.15 Keyboard Lock

Run the chart at 5 mm/sec.

Toggle the "LOCK" button several times and note the display reads "KEYBOARD LOCKED" AND "KBD UNLOCKED". Leave in the "KEYBOARD LOCKED" mode.

Activate the left and right "MARK EVENT" buttons and verify the right event marker functions.

Depress every other key and button on the front panel except "LOCK" and "STOP". Note no action occurs. Verify also that the pen positions controls are locked.

Press "STOP" and verify recorder stops.

Press 5 mm/sec and verify recorder will not run and display will indicate "KEYBOARD LOCKED".

Depress "STOP" and unlock the keyboard by pressing "LOCK" again.

2.4.16 Divide by Checks

Set the recorder to "STOP".

Locate the DIP switch on the Controller Board and set the switches as follows:

SW positions 1,2 & 4 OFF
SW position 3 ON

Run the chart recorder at 100 mm/sec and toggle the "DIVIDE BY" button. Note that the display and the chart speed will toggle between 100 mm/sec and .100 mm/sec. This is divide by 1000.

Set SW position 3 to OFF and toggle the "DIVIDE BY" button. Note that the display and the chart speed remains at 100 mm/sec. This is divide by 1.

Set SW position 4 to ON and toggle the "DIVIDE BY" button. Note that the display and the chart speed will toggle between 100 mm/sec and 100 mm/min. This is divide by 60.

Set SW position 3 to ON and toggle the "DIVIDE BY" button. Note that the display and the chart speed will toggle between 100 mm/sec and 1.00 mm/sec. This is divide by 100.

Depress the "STOP" button.

2.4.17 Local/Remote

While in "STOP", toggle the "LOCAL/RMT" button and note the display reads "LOCAL" and "REMOTE". Leave in "REMOTE".

Depress 5 mm/sec and note the recorder will not run and the display will indicate "3000 IN REMOTE".

Depress the "LOCAL/RMT" button once and the display should read "LOCAL". Depress "STOP".

2.4.18 Chart Supply and Interlocks

Set the recorder to "STOP".

Open the chart table, remove paper and note the display reads "INTERLOCK".

Defeat both the table and the chart paper out interlocks by covering them over with paper. Note the display reads "STOP" when both are defeated.

Check that by uncovering EITHER interlock the message "INTERLOCK" will appear on the display. Re-defeat both interlocks.

With both interlocks defeated, ensure no paper is in the recorder and locate the 5 paper sensors on the left side plate.

2.4.18 Chart Supply and Interlocks (cont.)

Will all sensors uncovered, press the "CHART SPLY" button on the front panel. The display should read "SUPPLY = 25% - 0%".

Cover the bottom sensor and press the "CHART SPLY" button again. The display should read "SUPPLY = 50% - 25%". Repeat covering only the front top sensor. Same display should result.

Cover the bottom and the middle sensors and press the "CHART SPLY" button again. The display should read "SUPPLY = 100% - 50%". Repeat covering the two front sensors. Same display should result.

Cover all five sensors and press the "CHART SPLY" button again. The display should read "SUPPLY = 100% - 50%".

Uncover all interlock sensors, re-install paper and close the table.

2.4.19 Event Markers

Run the chart at 5 mm/sec and press the "LEFT EVENT" button. The right event marker should deflect to the left apx. 1-2 mm and remain deflected as long as the button is held.

Repeat with the "RIGHT EVENT" button and check for right deflection.

Enable the timer and set for 1 second. With the chart recorder running, check for 1 second event marks. The deflection will be left for 9 pulses and right every tenth pulse.

2.4.20 Chart Speed Accuracy

With the chart running at 500 mm/sec and the 1 second internal timer enabled, allow the chart to run for 3 to 4 meters of paper.

Using a meterstick, measure the distance between the leading edge of two 1 second pulses. This should be 1000 mm +/- 2.5 mm for an accuracy of 1/4%.

Change the speed to 5 mm/sec and run for at least 2 meters of paper. Measure the distance between 20 of the 10 second pulses. This should be 1000mm +/- 2.5 mm for an accuracy of 1/4%.

Stop the recorder.

2.4.21 Annotation Printing

Run the chart recorder at 25 mm/sec and enable the annotation by pressing the "PRINT" key until "ENABLE ANNOTATION" is displayed.

The annotation date is printed in left margin as follows: Time arrow, actual time, date, chart speed, test # and message. The sequence is repeated continuously.

Change the chart speed to 10 mm/sec and note the annotation resets and begins a new sequence with the arrow.

2.4.22 Self Test

Run the recorder at 10 mm/sec and DISABLE ANNOTATION. With no inputs to the recorder, set channel 1 position to 10 mm from the RIGHT chart edge. Center all other analog channels. Set the EVENT TIMER to "TIMER OFF".

Press the "SELF TEST" button. The following sequence should occur: The recorder will run at 25 mm/sec. All analog channels will deflect to the left electrical limit and ramp toward the right electrical limit. During this time the left annotation head will print a series of alpha characters and numbers and the timer will operate at .1 MIN intervals (apx 1 pulse every 16 mm). When the pens reach the right limits, channel 1 will deflect to the left and at the same time a "bar" will be printed by the annotation head. Then channel 1 will deflect to the right and all other analog channels will deflect to the left.

Examine the results and ensure that the printed "bar" is aligned with the channel 1 left deflection, that the right deflection of channel one and the left deflection of the remaining analog channels are on the same time line. Specifications for both are .005"

Check that all analog traces deflected into the Right and Left ELECTRICAL limits, which are 1 to 1.5 mm beyond the chart edges (see step 2.4.24).

Stop the recorder.

2.4.23 Chart Centering and Paper Tracking

With Roll paper installed, run the recorder about 6 feet at 100 mm/sec to align paper.

The chart paper should center on the table within +/- .050".

Run the chart at 500mm/sec for about 10 seconds and note pen tip location and wander. Use an event marker for reference.

Change speed to 5 mm/sec and run for about 20 seconds. Then change speed to 25 mm/sec and run for about 20 seconds.

Examine all three traces. The median tracking point of the event marker should be within +/- .025" of the event ladder. The TOTAL chart wander must not exceed +/- .025" over the entire run.

2.4.24 Limits

With the chart stopped, manually move each analog pen to the right and left MECHANICAL limits. The pen tip excursion should be 2.0 to 2.5 mm beyond the chart edge. Exception is channel 1 left edge which should be at least 1 mm beyond edge.

With no inputs to the analog channels, run the recorder and center all the analog channels.

Apply a 1 hz triangle wave to each drive amplifier mini-jack input. Adjust the amplitude to drive the pen into the electrical limits. (About 6V P/P).

Observe the chart traces and ensure that the pen excursion is 1 to 1.5mm beyond the chart edges.

2.4.25 Frequency Response

With the chart running at 25 mm/sec, change the input to sine wave at 1 hz. Adjust the input amplitude for full scale output on one of the channels. Increase the frequency as per table below and check for outputs as indicated:

40 mm channels	--	DC to 60 hz +/- 1 division
50 mm channels	--	DC to 50 hz +/- 1 division
100mm channels	--	DC to 30 hz +/- 1 division

For 100mm channels only, reset input frequency to 1 hz and input amplitude to display 50mm (1/2 scale) P/P. Increase frequency to 50 hz and check for 50mm +/- 1 division.

Reset input frequency to 1 hz and input amplitude for 10 divisions P/P on the chart. Increase frequency as per table below and check for outputs as listed:

40 mm channels (10 div)	--	DC to 140 hz +/- 1 division
40 mm channels (10 div)	--	-3db down max at 160 hz (7 div or more)
50 mm channels (10 div)	--	DC to 125 hz +/- 1 division
50 mm channels (10 div)	--	-3db down max at 140 hz. (7 div or more)
100mm channels (10 div)	--	DC to 125 hz +/- 1 division
100mm channels (10 div)	--	-3db down max at 140 hz. (7 div or more)

2.4.26 Overshoot

Run recorder at 25 mm/sec and apply a 1 hz square wave to the inputs. Set amplitude for 90% FS.

Check for less than 1% overshoot F.S.

Change input amplitude to 20% of full scale.

Check for less than 1% overshoot F.S.

2.4.27 Amplitude Accuracy and Linearity

Connect a 0-10V dc source to each Drive amplifier input. Set the voltage to 0V.

With the chart running, center each analog pen.

Apply +2.500V DC to the inputs. The pens should deflect left full scale +/- .2% FS.

Apply +2.500V DC to -2.500V DC in steps of .500V.

Left chart edge accuracy is .2% FS. All other points must be within .35% FS.

2.4.28 Channel Reverse

Set input to Channel 1 to 0V DC.

Run the chart at 5 mm/sec and center the pen with the pen position buttons.

Depress "REV POL".

Message "CHANNEL NO. =" will appear in display.

Depress "1" pushbutton. Note the pen position may shift up to 20% from chart center. Re-zero the pen to chart center as needed.

Apply +2.500V DC to the channel 1 input.

The pen should deflect to the right full scale within .35% F.S.

Change input to 0V DC. Reverse channel one again to return channel 1 to Normal polarity.

2.4.29 Servo Amplifier Options

Set switches on the servo amplifiers as follows:

(RIGHT = OFF and LEFT = ON)

SW position 2 ON
SW positions 1, 3, 4, 5 & 6 OFF
(set up for 2V F.S.)

With 0V DC applied to inputs, center the pens.

Apply + and - 1.000V DC to the inputs. The pens should deflect FS Left within .2% and FS Right within .35%.

Set inputs to 0V and reset servo switches to:

SW position 4 ON
SW positions 1, 2, 3, 5 & 6 OFF
(set up for 10V F.S.)

2.4.29 Servo Amplifier Options (cont.)

Center the pens if necessary and apply + and - 5.000V DC to the inputs. The pens should deflect FS Left within .2% and FS Right within .35%.

Apply 0V DC to the inputs and reset servo switches to:

SW positions 1 & 3 ON
SW positions 2, 4, 5 & 6 OFF
(set up for 5V F.S. and reverse monitor output)

Connect a DVM to the Output Monitor BNC jack on the servo board on channel 1.

Center the pen as needed and note the output as read on the DVM. The output should be 0V +/- 1V.

Move the pen to the left and note the voltage becomes more negative. Move the pen to the right and note the voltage becomes more positive.

Recenter the pen and adjust position for 0.0V as read on the DVM. (Pen may NOT be at chart center).

Apply +2.000V to the input. The pen will deflect to the left 20 divisions from referenced zero and the output as read on the DVM will be MINUS 2V (apx).

Set Switch S1 to OFF (Normal polarity) and note the pen is still deflected to the left but the DVM now read +2V (apx).

Repeat above procedure for all channels.

2.4.30 Remote Inputs

Remove all input connections from the servo pin jacks.

For all connections below, the common is either pin 29 or pin 30 of the remote connector on the master controller board. Remote input connector - Gould Part No. 244550-37, supplied with recorder

Connect a frequency counter to the remote connector pin 27.

Run the recorder at 100 mm/sec and observe the output frequency of 8 khz +/- .25% (+/- 20 hz).

Set the recorder to Stop. Remove the connection from pin 27. Connect a Zero-based square wave of +3.5V peak to pin 28.

Set the frequency to 1 khz and set the recorder to EXT. Turn the timer on at 1 second rate. Note the chart recorder runs at about 12.5 mm/sec.

Ramp the input frequency to 8.000 Khz. Measure the accuracy of the chart speed. It should be 100 mm/sec +/- .25% (+/- 2.5mm).

2.4.30 Remote Inputs (cont.)

Ramp the input frequency to 40.000 Khz. Measure the accuracy of the chart speed. It should be 500 mm/sec +/- .25% (+/- 2.5mm).

Set the recorder to "STOP" and remove the connection from pin 28.

Make closure connections to pins 1,2,22,23,24,25 and 26. These will be closed to ground (low true) in the following remote chart speed tests. Pin 1 operates on edge triggering while the remaining pins can be held in one state.

Set the recorder to STOP. Make the following tests and observe results on the display and by the chart motion.

An O in the column indicates open pins
An X in the column indicates shorted pins
A P in the column indicates to pulse low and return to open

1	2	S0 22	S1 23	S2 24	D0 25	D1 26	Results
O	O	O	O	O	O	O	RECORDER STOPPED
X	O	O	O	O	O	O	RECORDER IN EXTERNAL
X	P	O	O	O	O	O	RECORDER STOPPED
X	O	X	O	O	O	O	CHART SPEED OF 5 MM/SEC
X	O	O	X	O	O	O	CHART SPEED OF 10 MM/SEC
X	O	O	O	X	O	O	CHART SPEED OF 50 MM/SEC
X	O	O	O	X	X	O	CHART SPEED OF .050 MM/SEC
X	O	O	O	X	O	X	CHART SPEED OF 50 MM/MIN
X	O	O	O	X	X	X	CHART SPEED OF .50 MM/SEC
X	O	O	O	X	O	O	CHART SPEED OF 50 MM/SEC
X	P	O	O	X	O	O	CHART STOPPED
O	O	O	O	X	O	O	CHART STOPPED
O	O	X	X	X	O	O	CHART STOPPED
P	O	X	X	X	O	O	CHART SPEED OF 500 MM/SEC
O	P	X	X	X	O	O	CHART STOPPED

Remove connections from the remote connector.

With no connections to channel 1, position the pen to the RIGHT chart edge. Connect pin 19 of the remote connector to channel 1 analog input. Set the TIMER to "TIMER OFF".

With the chart running, there should be no timer pulses on channel one or the event pen.

Turn the TIMER ON and set for 1 SECOND. Note that the timer pulses appear on the event pen AND on channel 1 analog pen. The amplitude on channel 1 should be 4-5V NEGATIVE pulses and will pulse ONLY in the NEGATIVE direction. The event pen traces should be normal, 9 pulses to the left and one pulse to the right.

Stop the recorder and remove the pin 19 connection and the analog channel connection.

2.4.30 Remote Inputs (cont.)

Connect pin 20 of the remote connector to ground. Run the recorder and note the event pen pulses at 1 second intervals, 9 pulses to the left and 1 pulse to the right.

Short pin 21 of the remote connector to ground. The event pen should deflect LEFT as long as pin 21 is grounded, overriding the timer.

Remove the connections from pins 20 and 21.

With the recorder running, short remote pin 3 to ground. The standard right hand event marker should deflect to the left.

Open pin 3 and short remote pin 4 to ground. The standard right hand event marker should deflect to the right.

Open pin 4 of the remote conenctor.

For optional event markers, shorting the indicated remote pin to ground will deflect the marker to the left or right as stated:

OPTIONAL EVENT MARKER	PIN #	DEFLECTION
1	5	LEFT
1	6	RIGHT
2	7	LEFT
2	8	RIGHT
3	9	LEFT
3	10	RIGHT
4	11	LEFT
4	12	RIGHT
5	13	LEFT
5	14	RIGHT
6	15	LEFT
6	16	RIGHT
7	17	LEFT
7	18	RIGHT

Stop the recorder and connect a DVM to remote pin 32 and ground. With the recorder at "STOP", the DVM should read apx 5V DC.

Pull the writing table slightly ajar until the "INTERLOCK" message appears on the display. At this time the DVM should read apx 0V DC.

Remove the DVM.

2.4.31 Interface Input Connections/Writing Quality

Install the dummy interface input card. Remove any connections from the drive amplifier phone jacks.

Signal input connector - Gould Part No. 245537-37, supplied with recorder. Make input analog signal connections to pins 20 thru 27 inc. on the 37 pin interface input connector. Pin 20 is channel 1 thru pin 27 which is channel 8. Commons are pins 1 thru 11 on the same board.

Connect a function generator to the inputs and run the chart at 25 mm/sec. Set the generator for about 25 Hz F.S. sine wave and note that a signal passes to all channels.

Reduce frequency to 1 Hz and change to a triangle wave. Run the chart at about 5 mm/sec.

Check writing quality:

Traces should be dry about 1/2 way down the chart table.

2.4.32 Multiple Power Supply

Remove power from the recorder and test ONE supply at a time as follows:

Install only one 15V P.S. and apply power to the recorder. Run chart at 100mm/sec and apply a F.S. sine wave to all channels. Slowly increase frequency to 20 Hz. The recorder should have enough power to drive all channels at least 15-20 Hz F.S. with only one power supply.

Stop recorder and test each supply independently.

Re-install all power supplies and check unit at maximum frequency response to ensure all supplies function in parallel.

2.4.33 Final Set Up

Set recorder to "STOP". Ensure clock and date are set correctly. Set switches on master controller board as follows:

SW position 1 OFF = WARM START (ON = Toward PC Board)
SW position 2 OFF = REAL TIME CLOCK
SW positions 3 & 4 ON = DIVIDE BY 100.

Set switches on the SERVO board as follows:

SW position 3 ON
SW positions 1,2,4,5 & 6 OFF
This is 5V F.S. span and normal polarity of monitor output.

Remove all analog inputs and position all pens to chart center. Then "STOP" recorder and remove power.

2.4.33 Final Set Up (cont.)

Wait about 2 minutes and reapply power. Verify that the time and date are still functioning. Run recorder and verify all pens are still at chart center.

STOP recorder and remove power.

If recorder has interchannel annotation heads, they should be tested using either an RS 232 or IEEE interface and addressing them directly or connecting appropriate amplifiers and checking thru the AMP PRINT mode.

2.5 MECHANICAL ADJUSTMENTS

2.5.1 Annotation Head Alignment

After replacement of the annotation head, initial adjustment prior to applying power is important to prevent damage to the head due to poor thermal contact with the paper.

The left/right location for the left edge annotation head may have to vary slightly from an initial setting due to paper tracking tolerances, especially for the 8 Ch unit where the writing area available is smaller than on the 6 Ch unit. In any case, the .120 inch characters are supposed to be written .030 inch from the left paper edge to the closest printing dot. Figure 4-9, Transport Assembly, on page 4.17 shows an exploded view of the left edge annotation assembly. To adjust left/right position of the annotation arm loosen multiple spline screw, item-5 in Fig. 4-9. Position annotation arm accordingly then tighten multiple spline screw.

Initial adjustment -- 8 Ch .... 0.120"	Measure Table edge to
Initial adjustment -- 6 Ch .... 0.170"	arm body

Annotation Head Pressure against chart is 100 grams +/- 5 grams. Measure with table closed and power off. Using a 0-150 gram gauge, lift tip without damaging writing element. Measure at 90 degree angle to the arm. The spring, item-8 in Fig. 4-9, has +/- 10 gram (step) adjustment on the end which is attached to the annotation mounting bracket, item-10 Fig. 4-9.

A one time adjustment of the annotation heat sink, item-11 Fig. 4-9, so that the writing element is parallel to the surface of the rubber roller on which it writes is required and is accomplished by twisting the square heat sink bar until the element remains parallel to the roller. Avoid damaging the writing element and flexible printed circuit cable on the under side. Adjust, by torquing the 1/4 inch square heat sink bar, item-11 Fig.4-9, so that the writing element on the annotation arm is parallel to the rubber roller on the writing table. Improper adjustment will show up as light writing at top or bottom edge of printed letters and eventual damage of the writing element from overheating. Screws, item-13 Fig. 4-9, must be tight during this adjustment.

2.5 MECHANICAL ADJUSTMENTS

2.5.2 Vertical Alignment Left Edge Annotation Head

The head is to be adjusted so that the writing element is centered on the crown (high point) of the rubber roller with respect to a plane parallel to the annotation arm. Use alignment gauge Gould Part No. CL-211327 to adjust up/down position of the annotation arm. Calibration instructions are given below for both Left Hand and optional interchannel heads.

Loosen the two screws, items-13 Fig. 4-9, which hold the heat-sink to the arm just enough to allow the heat-sink to slide up and down when the adjusting screw is rotated, item-7 Fig. 4-9. Do not loosen these screws to the point where separation between the parts could occur.

Raise the arm off the rubber covered roller, and interpose a .008"-.010" thick gauge block (about .35"wide x 1.125"long, feeler gauge) Gould Part No. CL-211327, between the head and the roller. The gauge block should be positioned to extend about .6" back beyond the cylindrically contoured ridge of the print head.

Rotate the alignment screw, item-7 Fig.4-9, top of the assembly to find the position where the gauge tool (CL-211327) is visually parallel to the bottom surface of the print-head.

From the screw orientation that yielded the above parallelism, rotate the alignment screw 1/6 turn in the direction which increases the separation between the print head wafer and the gauge block.

Remove the gauge block, and tighten the down the attachment screws, items-13 Fig. 4-9. Recheck element parallism.

2.5.3 Interchannel Annotation Head Alignment

The procedure for aligning interchannel annotation heads is the same as the procedure for aligning the the edge annotation head except that the interchannel annotation heads write on the top of the table roller instead of the front.

2.6 ELECTRICAL CALIBRATION

2.6.1 Chart Drive Board

This paragraph calibrates the Zero Offset and Gain adjustments for the paper speed VCO (Voltage Control Oscillator). Attach averaging frequency counter at TP2 (high probe) and TP6 (common).

Press 500 mm/sec and DIVIDE BY buttons.

Adjust R43 for 80,000 +/- 80 Hz.

Press 5 mm/sec button and adjust R27 for a frequency of 800 Hz +/- 0.8 Hz.

Repeat both adjustments until interaction of circuitry has been negated. Adjusting at 500 mm/sec first gives the least interaction.

2.6.1 Chart Drive Board (cont.)

Disconnect frequency counter and program event timer repetition rate for 1 second intervals. To select timing rate press the SET key, then repeatedly press the EVENT TIMER key until display reads 1 second, then press the ENTER key.

Press the 25mm/sec button, divide by function inactive. Run at least 1 meter of chart paper out the bottom of writing table.

Press front panel STOP button.

Remove chart paper and lay paper on flat surface.

With a meter stick measure the event pulses. There should be 41 pulses, counting the first and last pulse, over one meter of chart paper $\pm$2.5 mm. If a meter stick is not available the 1 mm and 1 cm grid lines printed on the chart paper may be used.

If the number of pulses over one meter of chart paper does not equal 41 than the base frequencies of 800 and 80K Hz must be changed to compensate for variation in the mechanical tolerances. If the chart is 10% fast reduce both frequencies by 10% and repeat measurement of pulses.

2.6.2 Pen Servo Board (Repeat this section for each pen)

2.6.2.1 Preset Initial Conditions (new boards only)

-- SPAN, DAMP, FREQ COMP, HEAT BAL and R-6 (SQ WAVE COMP) centered.
-- RIGHT LIMIT and LEFT LIMIT at full CCW. (25 turn controls)
-- Dip switches - # 3 "ON" (toward PC board); 1,2,4,5, and 6 "OFF".
(Monitor Polarity normal, +/- 2.5 v sensitivity)

2.6.2.2 Square Wave Comp. R-6

Prepare to calibrate R-6.
-- Insert Extender Board CL-210472 in card slot.
-- Insert Servo board in Extender.
-- Power ON, (COLD START) Provides zero penposition offset.
-- Chart speed at 5 mm/sec or slower.
-- Input signal at zero.

Adjust R-6's to center pens on channel centers. (+/- 1 div is adequate)

NOTE:

For the remaining adjustments on the servo board the Extender Board should not be used.

2.6.2 Pen Servo Board (cont.)

2.6.2.3 Span Adjust

Use pen position push button controls to exactly center the pen.

Apply +1.000 vdc to channel input via Analog Signal Input connector Gould Part No. 245537-37 or mini phone plug Gould Part No. 290144 (both supplied with recorder). Analog Input connector pin connection information is in Section II of the 3000 User's manual.

Adjust SPAN control for 10 divisions left deflection.

Recheck pen zero at chart center with zero volts applied then increase input to +2.500 vdc and fine adjust SPAN control for full scale left deflection. Adjust for +/- .2% of F.S. accuracy.

Apply + 2.500 vdc through - 2.500 vdc in steps of .500 vdc. Repeat and readjust span and zero ... Linearity must be within .35 % at all points with left deflection within 0.2%

Repeat span adjust for all channels.

2.6.2.4 Damping Adjust

Center pen using appropriate buttons and apply ± 2.0 volt, 10Hz square wave to each channel and adjust DAMPing for 1/2 div overshoot at 25 mm/sec.

2.6.2.5 Frequency Compensation Adjust

Set FREQ COMP at 25 mm/sec by sweeping from 10 Hz (full scale sine wave input) to the upper frequency limit of recorder (50 Hz 50 mm channels or 30 Hz 100 mm channels) on each channel. Adjust for less than +/- 1 div variation. Recheck damping at 80% F.S. square wave and reset FREQ COMP if necessary.

Reduce input amplitude to 10 mm and check 100 Hz sine wave response to be flat within 0.5 div. Check 125 Hz +/- 1 div response.

2.6.2.6 Limit Adjusts

Set LEFT and RIGHT electrical LIMITS using +2.7 VDC and -2.7 VDC. Adjust for 1 to 1.5 div deflection beyond channel limits -- except for L.H. 40 mm channel where the left deflection should be set at 1 mm outside the channel.

Adjust the mechanical limits for 2 to 2.5 mm overtravel on the channel extremes (Power OFF). Adjust the mechanical stops with the power off as follows:

Swing the pen to the left, loosen the right hand screw which clamps the left stop. Position the pen tip 2 to 2.5 mm outside the channel and move the stop to the pen hub and tighten the clamp screw. Similarly, repeat the operations for the right limit, using the left screw to loosen the R.H. stop. On the 80/100 mm penmotors the clamping screws are accessible without swinging the pen out of the way. Same 2.0 to 2.5 div overtravel.

2.6 ELECTRICAL CALIBRATION

2.6.2 Pen Servo Board

2.6.2.6 Limit adjusts (cont.)

NOTE:

Exceeding the penmotor limits or mis-setting the electrical or mechanical limits with the power on may result in one or more circuit breakers on the servo board opening. Breakers can be reset after removing the overload (center the pens).

2.6.2.7 Heat Comp

Refer to calibration of Pen Heat Control Board.

2.6.3 Pen Heat Control Board

Unplug thermal heat pens from Pen Heat Control Board and connect 100 Ohm DUMMY load resistor where pens were plugged into.

2.6.3.1 Heat Comp (Located on Servo Bd.)

Connect the FLOATING Inputs of the ANALOG Voltmeter across the 1ST. SIGNAL Channel DUMMY LOAD resistor. (-)INPUT to J1 PIN-2 and (+)INPUT to J1 PIN-1.

Set the CHART SPEED to 5 MM/MIN. (or LESS).

Use PEN POSITION to align the pen tip (no chart trace) with approximate CHART CENTER (+/-MM).

Adjust the MINIMUM PEN HEAT trimpot (R-18) for an ANALOG Voltmeter reading of 1 Volt +/-.05 Volts (+/-one minor division).

Apply a 1 Hz. (+/-.1 Hz.) TRIANGLE signal to the input of the 1ST. ANALOG PEN channel's DRIVE AMP. (upper input connector). Adjust the INPUT signal and the DRIVE AMP's ELECTRICAL LIMITS to cause MORE THAN FULL SCALE pen travel without hitting the MECHANICAL limits.
[Do not disturb drive amp adjustments if already calibrated.]

Reduce INPUT signal to cause between 75% to FULL SCALE with priority given to obtaining pen travel that is not hitting the MECHANICAL or ELECTRICAL LIMITS.
(75% of: 40mm = 30mm, 50mm = 37.mm, 100mm = 75mm).
(90% of: 40mm = 36mm, 50mm = 45mm, 100mm = 90mm).

Ignore the ANALOG voltmeter's D.C. voltage reading and adjust the 1ST. Drive Amp. channel HEAT COMP. trimpot (AR-40 on DRIVE AMP. board) to MINIMIZE the 1 Hz. "Wobble" of the meter to LESS than .1 Volts Peak to Peak (+/- one small division).

Remove Drive Amp. INPUT signal.

2.6.3 Pen Heat Control Board

2.6.3.1 Heat Comp (cont.)

Repeat STEPS for each ANALOG PEN channel (see Table 2-1 for respective METER CONNECTIONS, MINIMUM PEN HEAT, and Drive Amp HEAT COMP. trimpots).

Disconnect the ANALOG voltmeter.

2.6.3.2 Minimum Pen Heat Adjustment (R-43 and R-54 may not be present on newer models)

Connect the "FLOATING" inputs of the DIGITAL Volt Meter across the DUMMY LOAD of the 1ST. SIGNAL Channel. (-)INPUT to J1 PIN-2 and (+)INPUT TO J1 PIN-1).

Set CHART SPEED TO 5MM/MIN. or LESS.

Adjust the 1ST. SIGNAL channel MINIMUM PEN HEAT trimpot (R-18) for a reading of (-)1.1 Volt (+/-.03 Volts).

Repeat for ALL PEN HEAT BOARD CHANNELS. (see Table 2-1 for respective MINIMUM PEN HEAT trimpots and METER INPUTS).

2.6.3.3 Maximum Pen Heat Adjustment (R16, R28, R36 and R48 may not be present on newer models)

Connect a JUMPER (short) between JA-22 and JA-3.

Adjust the 1ST. ANALOG PEN channel "MAXIMUM PEN HEAT trimpot (R-16) for a reading of (-)10 Volts (+/-.05 Volts).

Remove JUMPER.

Repeat for the remaining channels. (see Table 2-1 for the respective METER INPUTS, JUMPER LOCATIONS, and MAXIMUM PEN HEAT trimpots).

2.6.3.4 Chart Speed Compensation

Connect the FLOATING Inputs of the DIGITAL Voltmeter across the DUMMY LOAD of the 1ST. EVENT Channel. (-)INPUT to J2 PIN-2 and (+)INPUT TO J2 PIN-1).

To save chart paper, alternate between Chart STOP and 100MM/SEC. and adjust CHART COMP. trimpot (R-10) for (-)3.5 Volts +/-.03 Volts.

2.6.3.5 Frequency Compensation

Connect the FLOATING Inputs of the DIGITAL Voltmeter across the DUMMY LOAD of the 1ST. ANALOG PEN channel. (-)INPUT to J1 PIN-2 and (+)INPUT to J1 PIN-1).

2.6.3 Pen Heat Control Board

2.6.3.5 Frequency Compensation (cont.)

Use PEN POSITION to align the pen tip (no chart trace) with approximate CHART CENTER (+/-MM).

Apply a 6 Hz. (+/-.1 Hz.) TRIANGLE signal to the input of the 1ST. ANALOG PEN channel's DRIVE AMP. (upper input connector). Adjust the INPUT signal and the DRIVE AMP's ELECTRICAL LIMITS (if required) to cause MORE THAN FULL SCALE pen travel without hitting the MECHANICAL limits.

Reduce the INPUT signal to observe pen deflection (no chart trace) between a Maximum of FULL SCALE and FULL SCALE -2MM Peak to Peak.

Adjust the 1ST. ANALOG PEN channel FREQUENCY COMP. trimpot (R-60), on the Heat Board, for a meter reading of:
(-)5.5 Volts +/-.05 Volts (for 40mm & 50mm channels) and
(-)7.1 Volts +/-.05 Volts (for 100mm channels).

Remove Drive Amp INPUT signal.

Repeat steps for each ANALOG PEN channel (see Table 2-1 for respective METER CONNECTIONS and FREQ. COMP. trimpot.

2.6.3.6 Final Setup

Set Chart Speed to STOP.

Remove all test leads and dummy loads.

Set R-1,2,3,4 to Mechanical Center.

Plug in respective heat pens.

TABLE 2-1 PEN HEAT CONTROL CALIBRATION CHART

HEAT PEN Channel	METER INPUT Conn.	HEAT COMP. Adj.	MINIMUM PEN HEAT Adj.	MAXIMUM PEN HEAT Adj.	MAXIMUM PEN HEAT ---Jumper	CHART SPEED Comp.	SIGNAL FREQ. Comp.
1ST. SIGNAL	(-) to J1-1 (+) to J1-2	(DR.AMP) AR-40	R-18	R-16	JA-3 to JA-22	R-10	R-60
1ST. EVENT	(-) to J2-1 (+) to J2-2		R-43	R-36	JC-3 to JC-22		
2ND. SIGNAL	(-) to J3-1 (+) to J3-2	(DR.AMP) BR-40	R-30	R-28	JB-3 to JB-22		R-62
2ND. EVENT	(-) to J4-1 (+) to J4-2		R-54	R-48	JD-3 to JD-22		

SECTION III

MAINTENANCE

3.1 INTRODUCTION

This section contains subassembly replacement and troubleshooting instructions for the Gould RS 3200 and RS 3400 thermal recorders. For replacement information on materials regularly consumed in operation refer to the maintenance section in the 3000 User's manual.

3.2 SUBASSEMBLY REPLACEMENT

WARNING:

MAKE SURE POWER SWITCH IS TURN OFF AND RECORDER IS DISCONNECTED FROM POWER SOURCE BEFORE DISASSEMBLY.

3.2.1 Carrying Case

Refer to Figure 4-5 in the illustrated parts breakdown section of this manual.

The top and the side covers of the carrying case are removable allowing access to certain areas on the recorder. The top of the carrying case is held on by either (4) screws, item-2 or by (4) clip springs located approximately in the same area as the screws are shown. To remove top cover held on by clip springs, grasp "U" shaped cover, item-1, near the top middle of both sides with the palms of your hands. While applying enough inward pressure to prevent hands from slipping, lift top cover straight up. Remove the side cover, located below the handle, by unscrewing the (3) screws, item-15, and sliding cover, item-14, down. Suggested method for removing side cover is to position recorder on work bench so that the side which is to be removed extends beyond the table top allowing access to screws.

To remove the recorder from its carrying case remove the (4) front panel screws, (8) bottom screws and (2) rear screw which secure recorder into carrying case. Recorder slides out the front of the carrying case as depicted in Figure 4-1.

3.2.2 Separating Card Cage, Transport and Signal Conditioner Enclosure

Refer to Figure 4-6 in the illustrated parts breakdown section of this manual unless otherwise noted.

Remove recorder from carrying case in portable systems or saddle in rack mounted systems.

To detach the signal conditioner enclosure remove the two screws, on the top, which hold the enclosure, item-13, to the rear panel. Next remove the screw, item-6 Figure 4-15, which holds the bottom of enclosure, item-13, to card cage, item-9, (earlier versions of enclosure do not have access hole in opposite side of enclosure, but can be removed from underside by tilting recorder on left side). Remove (2) nut assemblies, item-19, which sercure enclosure to front panel, item-18, (RS 3400 nut is on outside of enclosure, RS 3200 nut is on inside of enclosure).

3.2.2 Separating Card Cage, Transport and Signal Conditioner Enclosure (cont.)

The screws in the ejector assemblies, item-17, must be completely unscrewed and ejectors lifted over front panel while removing enclosure. Unplug flat cable, item-12, complete separation.

To detach the card cage from the transport remove the (3) screws, item-10, from each side. Unplug the flat cable which comes from the front panel board and connects to the tops of the mother-in-law and the mother boards. Unplug the stepper motor connector from the bottom of the mother board. Separate the card cage from the transport far enough to allow access to the penmotor connectors. Unplug the penmotor cables, item-8, from the penmotors and the cable, item-11, which is connected to the bottoms of the mother and the mother-in-law boards.

3.2.3 PC Board Replacement

Most of the electronic circuitry is contained on the PC boards plugged into the card cage. To remove any one of the PC boards the rear panel must be removed. The recorder does not have to be removed from its carrying case but the top cover must be removed so that the (4) screws on the top of the rear cover can be removed. Also remove the (4) screws on the back of the rear panel. Refer to Figure 4-16 for rear panel removal illustration and PC board orientation.

The paper out sensor board, speed monitor board, mother-in-law board, chart supply board, keyboard and optional interchannel annotation driver board are all PC boards which perform functions remote to the card cage.

The paper out sensor board is mounted below penmotor Ch. 1 inside the chart supply compartment; refer to Figure 4-8 item-30. To remove paper out sensor board remove screw, item-31, and unplug board from cable connector.

The speed monitor board is also depicted in Figure 4-8, item-46. To remove speed monitor board unscrew item-47 while holding nut, item-48 with a wrench.

The chart supply sensor board is illustrated in figure 4-10 item 5. Item-3 the guide assembly must be removed before chart supply board is removed.

The mother-in-law board is attached to the pen bar assembly and requires the separation of the card cage from the transport before mounted screws, depicted in Figure 4-11 item-6, can be removed.

To remove the keyboard PC board from the control panel assembly, Figure 4-14, unscrew the (10) screws item-4 which holds assembly together. Unplug flat cable from connectors on top of the mother-in-law board and the mother board.

NOTE:

The flat cable is attached to the keyboard PC board and does not unplug.

The optional interchannel annotation driver board is located below the ink plunger and cartridge assemblies on the top side of the pen bar above the transport. The driver board plugs into the bottom row of connectors on the mother-in-law board. Before removing driver board unplug annotation heads which plug into socket on driver board.

3.2.3 PC Board Replacement (cont.)

To remove the mother board separate the card cage from the transport. Remove the (8) screws which retain the mother board support assembly to card cage, refer to Figure 4-17 items-2 and -15. After support assembly has been removed the mother board can be separated from the support bars by removing the screws, item-6, which attach mother board, spacer and shield to support bars. During installation of mother board do not completely tighten screws, item 6, until support assembly has been installed into card cage; at that point align connectors on the mother board with PC card guides and tighten screws, item-6.

3.2.4 Writing Table

Refer to Figure 4-12 in the illustrated parts breakdown section of this manual.

To remove writing table assembly, fully open writing table. Grasp the pull bar, item-13, in your left hand. Flex the right support link, item-3, far enough away from writing table to allow the pivot screw cap, item-9, to slip out of hole in support link. The writing table should now fall out of the recorder.

3.2.5 Front Panel

Refer to Figure 4-6 in the illustrated parts breakdown section of this manual.

To remove front panel assembly remove carrying case cover in portable systems or extend recorder on its slide in rack mounted systems. Unplug the flat cable which is connected to the front panel, from connectors on the top of the mother-in-law and the mother boards. Detach latch, item-2, by removing the screw, item-3, which attaches latch to front panel (latch is located on left side RS 3400 and right side RS 3200). Remove the pivot screws, item-6, from each side and feed flat cable through notch in panel bezel assembly, item-18, while pulling front panel assembly away from recorder.

3.2.6 Penmotor

Refer to Figure 4-11 in the illustrated parts breakdown section of this manual.

Each penmotor is held in place by (2) screws, item-24 which retain penmotor from the top. To gain access to the penmotor screws the ink manifold, item-26, may have to be moved out of the way. Ink tubes do not have to be removed from manifold in order to move manifold, but ink pen tube which is attached to penmotor being replaced must be removed. Turn ink value OFF before removing ink pen (ink valve is located above manifold stem to which ink tube is connected) by rotating value CCW until mechanical stop is reached. Remove (2) screws, item-27, which hold manifold to pen bar. Gently move manifold out of the way and remove penmotor screws, item-27, while holding onto penmotor with free hand. Unplug penmotor cable and remove penmotor.

3.3 TROUBLESHOOTING

3.3.1 Introduction

This section provides troubleshooting hints to assist the service person in locating possible malfunction and their remedy.

3.3.2 Electrical Power

MALFUNCTION	POSSIBLE CAUSE	REMEDY
1. Recorder inoperative (Display blank and fan not running)	a. Recorder not connected to power source.	a. Connect to power source.
	b. Main fuse blown.	b. Replace fuse.

3.3.3 Chart Drive Malfunction

MALFUNCTION	POSSIBLE CAUSE	REMEDY
1. Display reads 'INTERLOCK'	a. Paper loaded wrong or supply roll empty.	a. Check supply roll, refer to User's manual for proper loading.
	b. Open table sensor item-16 Fig.4-8 misaligned.	b. Reposition sensor so that its focal point is the closed writing table thru hole in side plate.
	c. Paper out sensor bd. item-30 Fig. 4-9 malfunctioning or out of focus.	c. Loosen mounting screw item-31 and position bd. so sensor is located above paper travel.

3.3.3 Chart Drive Malfunction (cont.)

MALFUNCTION	POSSIBLE CAUSE	REMEDY
2. Display reads 'STOP MOTOR STALLED'	a. Speed monitor bd. item-46 Fig. 4-8 malfunction or timing disk item-45 Fig. 4-8 not traveling thru 'U' shaped sensor on speed monitor board.	a. Reposition speed monitor bd. bend mounting bracket if side plate is equipped with bracket (metal side plates do not have bracket)
	b. Drive belt broken.	b. Replace belt.
	c. Fuse on chart drive bd. blown.	c. Replace fuse.
	d. Stepper motor shaft turning but pulley is not.	d. Tighten set screw in pulley.
	e. Timing disk came off metal disk.	e. Glue timing disk back on to medal disk.
	f. Chart take-up drive gear not meshing properly.	f. Remove side cover on drive arm and adjust eccentric cam to lessen pressure.

3.3.4 Signal Malfunction

MALFUNCTION	POSSIBLE CAUSE	REMEDY
1. Trace unusually wide.	a. Noise appearing on pen tip.	a. Check input signal and cable connections. Determine if fault is on servo bd. or within penmotor by exchanging servo bds. and penmotor cables; repair or replace (unplug cables item-8 Fig. 4-6, at the penmotor).
2. No signal	a. Defective Servo bd. or penmotor.	a. Follow same remedy as Trace Unusually Wide.
	b. Signal conditioner defective.	b. Repair or replace.

3.3.4 Signal Malfunction (cont.)

MALFUNCTION	POSSIBLE CAUSE	REMEDY
3. Pens limp or biased	a. Servo out of calibration.	a. Calibrate servo bd.
	b. Defective servo bd. or signal conditioner.	b. Repair or replace.
	c. Loose pen.	c. Align and tighten pen.
	d. Loose penmotor band.	d. Tighten band tension 7.0 to 8.0 pounds using spring scale.

Gould instruments are individually tested and calibrated before shipment to assure dependability and verify their accuracy. To this procedure must be added an unseen ingredient of prime importance to you: the Gould concept of continuing service. Gould responsibility for each instrument sold covers far more than its delivery. Of equal concern is the equipment's suitability for its intended purpose, its correct installation, instruction of operating personnel -- plus future servicing and maintenance. The Gould Field Service Department offers customers any or all of these service:

Field Service

Installation
Field maintenance
NIST Certification

Training

Instruction of operators
On-site training seminars
Formal Training courses

Service Contracts

Fixed Fee
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Our Seal of Pride

Gould Inc., Test and Measurement Group and its predecessor organizations tracing back to Charles F. Brush, have been preeminent in instrumentation development since the 1920s. Among Gould's many achievements is a series of the world's best performing, most versatile, and reliable direct writing recording systems.

Today, Gould recorders and signal conditioners are the overwhelming choice for recording analog signals in the most critical industrial, scientific, and biophysical measurement applications. Whether recording the faintest life signals of a patient in a hospital operating room or the most critical variables in the laboratory or on the production line, you can expect accuracy, dependability, clarity, and permanence of the traces made by any Gould Recording System. Innovative design, coupled with highest quality, are hallmarks of all Gould products.

The Field Service Engineer

Gould field service engineers provide on-the-spot assistance whenever and wherever it is required. While every field service engineer is the product of intensive and thorough factory training, you will find that his greatest strength evolves from field experience and his knowledge of your objectives. He is aware of your problems, is willing and able to assist you in their solution, and is backed by the nation's most experienced organization in recording instrumentation.

Our field service engineers and technicians are daily engaged in the installation, testing, maintenance, repair and inspection of Gould recording systems all over the country. They can quickly provide you with any information about our instruments you may require; if not, they will find the answer to your problem.

Overhaul and Repair

Because we service only our own products, our customers can feel confident of prompt, effective results when they turn to Gould Factory Service Centers.

The repair service these centers provide is of particular appeal to those companies that do not operate an instrument repair facility of their own. By designating the nearest Gould Service Center as its maintenance depot, a Gould-equipped company is assured the best chance for continuous operation.

The Replacement Parts warranty is ninety (90) days from date of delivery.

Many companies with their own repair facilities find it more convenient and more truly economical to have their Gould equipment repaired by service contract with the closest Service Center. In addition to enjoying fast turn-around, these companies are spared the expense of carrying an inventory of recorder parts, accessories, and supplies.

Calibration and Certification

A small, quiet room in the Standards and Calibration Section at the Gould plant in Valley View, Ohio contains precision reference standards just one step removed from the prime reference measurement standards of the United States National Institute of Standards and Technology in Washington. Included in this room, which is temperature-controlled within one degree and has a constant relative humidity of 40%, are standards for voltage, frequency (derived from the atomic vibration of caesium), resistance, capacitance -- in fact all basic parameters of electrical measurement. The room is maintained under stabilized conditions 365 days a year.

The calibration practice of all Gould Service Centers is directly traceable to the National Institute of Standards and Technology. We can supply complete calibration for any Gould equipment, and we can also certify to manufacturer's specifications followed by a letter of certification when required.

Training

The Gould field service engineer will hold short training courses either on the job or at his facility. On-the-job training is usually a brief, informal session with the people who will actually be operating the Gould equipment.

Formal classroom training is more complete: detail information, a thorough review of underlying theory, training devices, demonstration of problem solving and examination of students to determine their understanding and proficiency is accomplished at our Valley View, Ohio plant.

Contracts

Gould offers an Extended Warranty Agreement for all its products, along with calibration traceable to NIST. Please contact the Service Center listed on the following pages for details before your warranty expires.

Companies of customers requiring temporary or permanent service are afforded contractual arrangements by which agreed-upon maintenance, repair upgrading and calibration services are performed on a routine basis. Service contracts are now in effect with a number of customers, affording substantial saving in time and money.

Owing to the various requirements of each customer, we do not reproduce here a standard, boilerplate agreement -- which might contain too much or too little. Instead, we tailor each contract to a particular customer's needs. This practice has single-handedly produced substantial savings in time and money for others; and it can do the same for you.

An extended warranty is available at the point of sale allowing a regulated budget for the first two years of ownership. You may take advantage of this warranty within the first year of ownership at a percentage of the current listed price.

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SECTION IV

PARTS IDENTIFICATION

4.1 INTRODUCTION

The following parts lists and schematic diagrams in Appendix A are included to assist in service and repair of the RS3200 and RS3400 thermal recorders. For replacement parts locate component in the appropriate figure, then refer to the Parts List which is pertinent to that figure.

To assure prompt and satisfactory delivery of replacement parts, include the following information with your purchase order:

1. Name, model number, and serial number of the recorder.

   Example: RS3400

Model: 35-V8404-10 Serial No: xxx

2. Description of the part as listed in manual.

3. Gould part number.

NOTE:

Do not use the symbol number from the parts list or the schematic to identify the desired parts on your order.

4.2 ATTACHING PARTS (A-P)

Attaching hardware is designated by an (A-P) after the line item it attaches to and continues until the line shown as -------- * --------. Unillustrated hardware is listed as an Attaching Part.

4.3 ASTERISK

Part numbers preceded by an asterisk * are not procurable.

4.4 USED ON CODE

The USED ON column identifies the recorder assembly for which that part is unique. If an on code letter is not present, that part is common to all recorders described in this manual. The used on codes are listed below.

LETTER CODE	RECORDER MODEL NO.
K	35-V8404-1X
L	35-V8420-1X
M	35-V8412-1X

LETTER CODE	RECORDER MODEL NO.
N	35-V8202-1X
P	35-V8210-1X

4.5 COMPONENT ORIENTATION

The corner mark placed inside some electronic components on PC board breakdowns indicates one of the following conditions to be true:

(1 cathode end of diode
(2) positive polarity of capacitor
(3) pin 1 of I.C.

```
**********************************************************************
*                                                                    *
*  THE PARTS LIST CONTAINED IN THIS MANUAL REFLECTS INFORMATION      *
*  IN EFFECT AT THE TIME OF ITS PUBLICATION.  THIS INFORMATION       *
*  IS INTENDED AS AN AID TO IDENTIFICATION AND SERVICING.            *
*  CERTAIN PARTS AND ASSEMBLIES MAY NOT BE AVAILABLE FOR SALE.       *
*  ITEMS ARE SUBJECT TO CHANGE AND GOULD INC RESERVES THE RIGHT      *
*  TO MAKE CHANGES WITHOUT NOTICE.                                   *
*                                                                    *
**********************************************************************
```

RS 3400 & RS 3200 THERMAL RECORDER
PORTABLE RECORDING SYSTEM
FIGURE 4-1

ITEM NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6	USED ON
	35-V8404-10	Recording System, Thermal, 4-50 mm, Portable (RS 3400)	K
	35-V8420-10	Recording System, Thermal, 2-100 mm, Portable (RS 3400)	L
	35-V8412-10	Recording System, Thermal, 2-50 mm, 1-100 mm, Portable (RS 3400)	M
	35-V8202-10	Recording System, Thermal, 2-50 mm, Portable (RS 3200)	N
	35-V8210-10	Recording System, Thermal, 1-100 mm, Portable (RS 3200)	P
1	35-V8404-00	Recorder, Thermal, 4-50 mm (RS 3400) (See Fig. 4-6)	K
	35-V8420-00	Recorder, Thermal, 2-100 mm (RS 3400) (See Fig. 4-6)	L
	35-V8412-00	Recorder, Thermal, 2-50 mm, 1-100 mm (RS 3400) (See Fig. 4-6)	M
1	35-V8202-00	Recorder, Thermal, 2-50 mm (RS 3200) (See Fig. 4-6)	N
	35-V8210-00	Recorder, Thermal, 1-100 mm (RS 3200) (See Fig. 4-6)	P
2	CL-811054-1	Enclosure Assy., Portable (RS 3400) (See Fig. 4-5)	KLMP
2	CL-811055-1	Enclosure Assy., Portable (RS 3200) (See Fig. 4-5)	N
3	CL-210430-0218	Screw, Panel, Pan Hd., 10-32 x 1-1/8 In. w/Nylon Washer (A-P)	
	13-262716-8206	Screw, Pan Hd., 8-32 x 3/8 In. (Not Shown)	

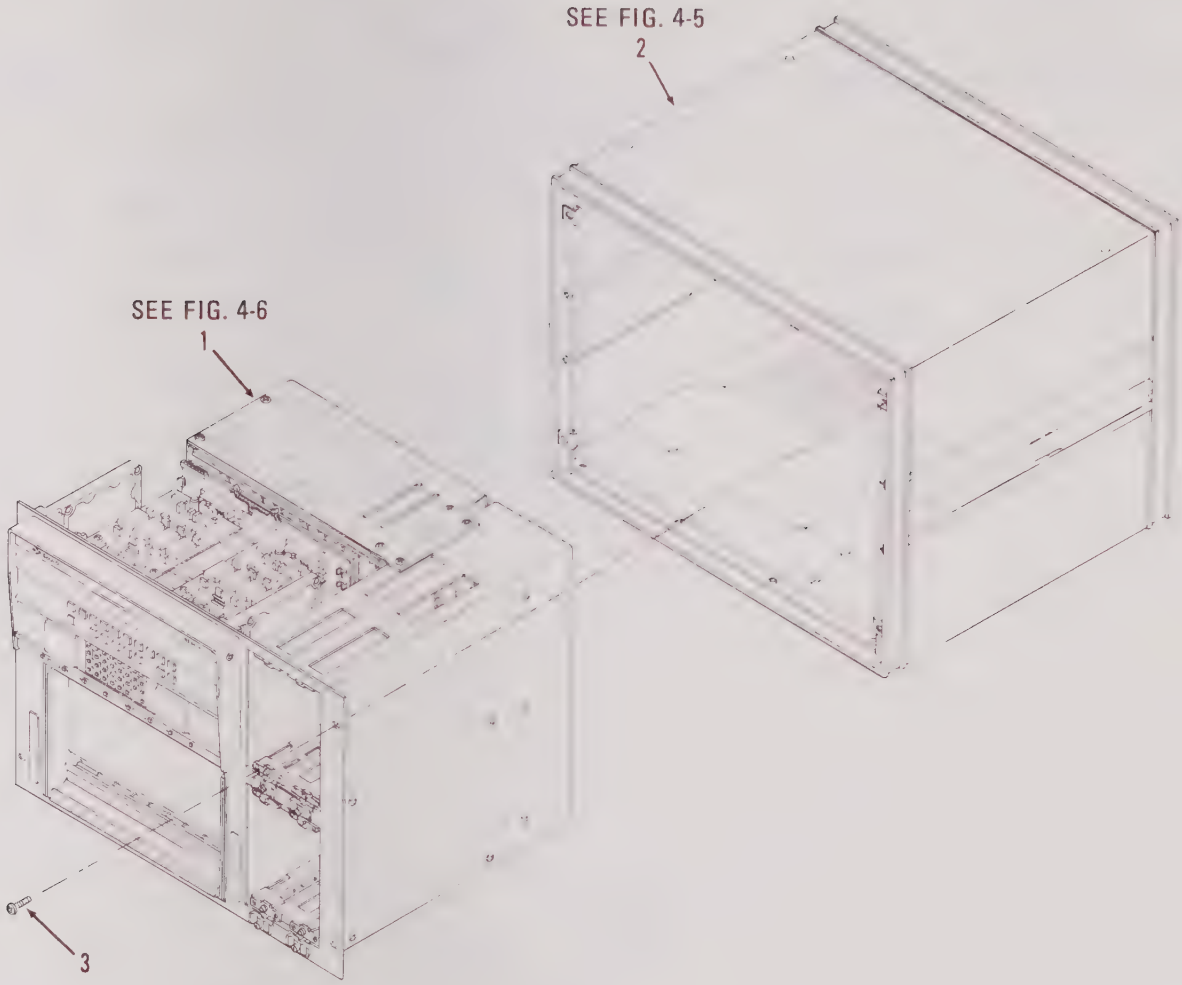


FIGURE 4-1 PORTABLE RS 3400 SERIES RECORDER

RS 3400 & RS 3200 THERMAL RECORDER
RACK MOUNTED RECORDING SYSTEM (RS 3400)
FIGURE 4-2

ITEM NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6	USED ON
	35-V8404-11	Recording System, Thermal, 4-50 mm, Rack Mounted (RS 3400)	K
	35-V8420-11	Recording System, Thermal, 2-100 mm, Rack Mounted (RS 3400)	L
	35-V8412-11	Recording System, Thermal, 2-50 mm, 1-100 mm, Rack Mounted (RS 3400)	M
1	35-V8404-00	Recorder Assy., Thermal, 4-50 mm (RS 3400) (See Fig. 4-6)	K
	35-V8420-00	Recorder Assy., Thermal, 2-100 mm (RS 3400) (See Fig. 4-6)	L
	35-V8412-00	Recorder Assy., Thermal, 2-50 mm, 1-100 mm (RS 3400) (See Fig. 4-6)	M
2	11-1202-39	Kit Assy., Rack Mount (RS 3400) (See Fig. 4-4)	KLM
3	13-262716-8206	Screw, Self-Tapping, Pan Hd., 8-32 x 3/8 In.	

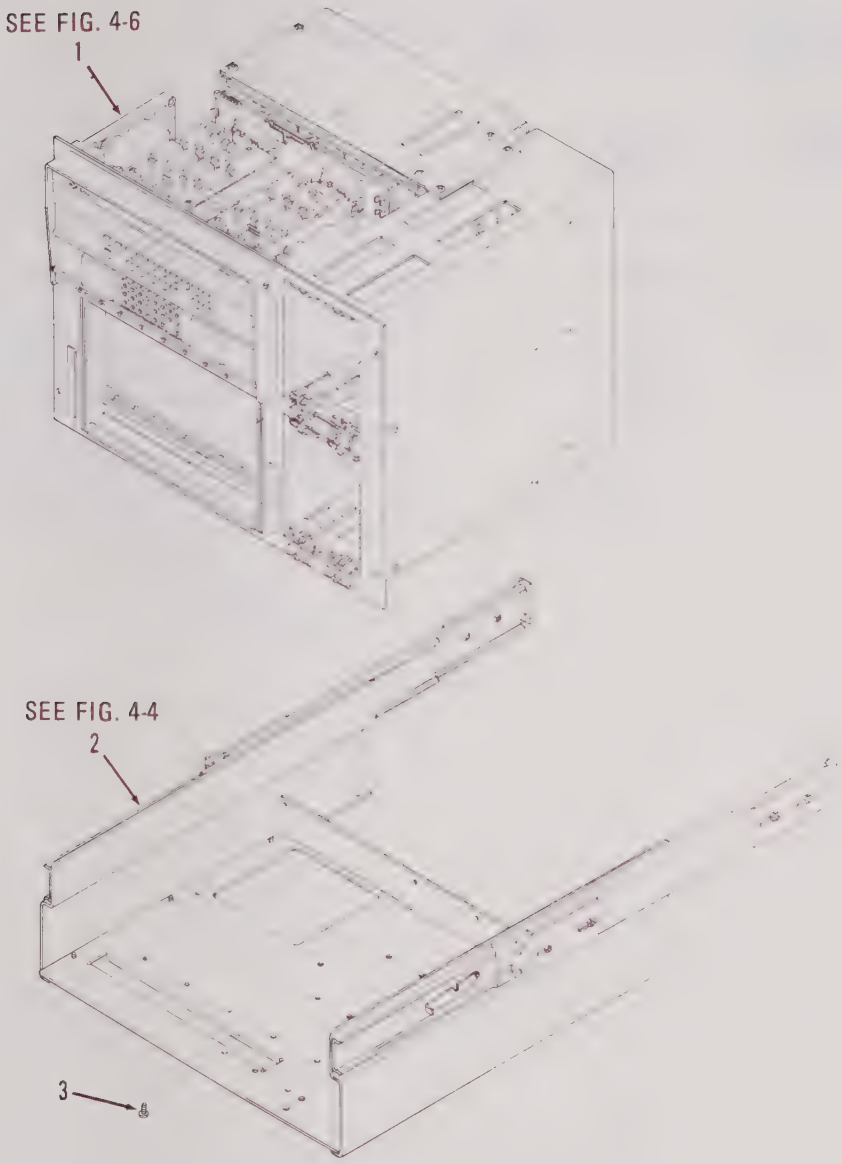


FIGURE 4-2 RACK MOUNTED RS 3400 SERIES RECORDER

RS 3400 & RS 3200 THERMAL RECORDER
RACK MOUNTED RECORDING SYSTEM (RS 3200)
FIGURE 4-3

ITEM NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6	USED ON
	35-V8202-11	Recording System, Thermal, 2-50 mm, Rack Mounted (RS 3200)	N
	35-V8210-11	Recording System, Thermal, 1-100 mm, Rack Mounted (RS 3200)	P
1	35-V8202-00	Recorder Assy., Thermal, 2-50 mm (RS 3200) (See Fig. 4-6)	N
	35-V8210-00	Recorder Assy., Thermal, 1-100 mm (RS 3200) (See Fig. 4-4)	P
2	11-1202-40	Kit Assy., Rack Mounting (RS 3200) (See Fig. 4-4)	NP
3	13-262716-8206	Screw, Self-Tapping, Pan Hd., 8-32 x 3/8 In.	

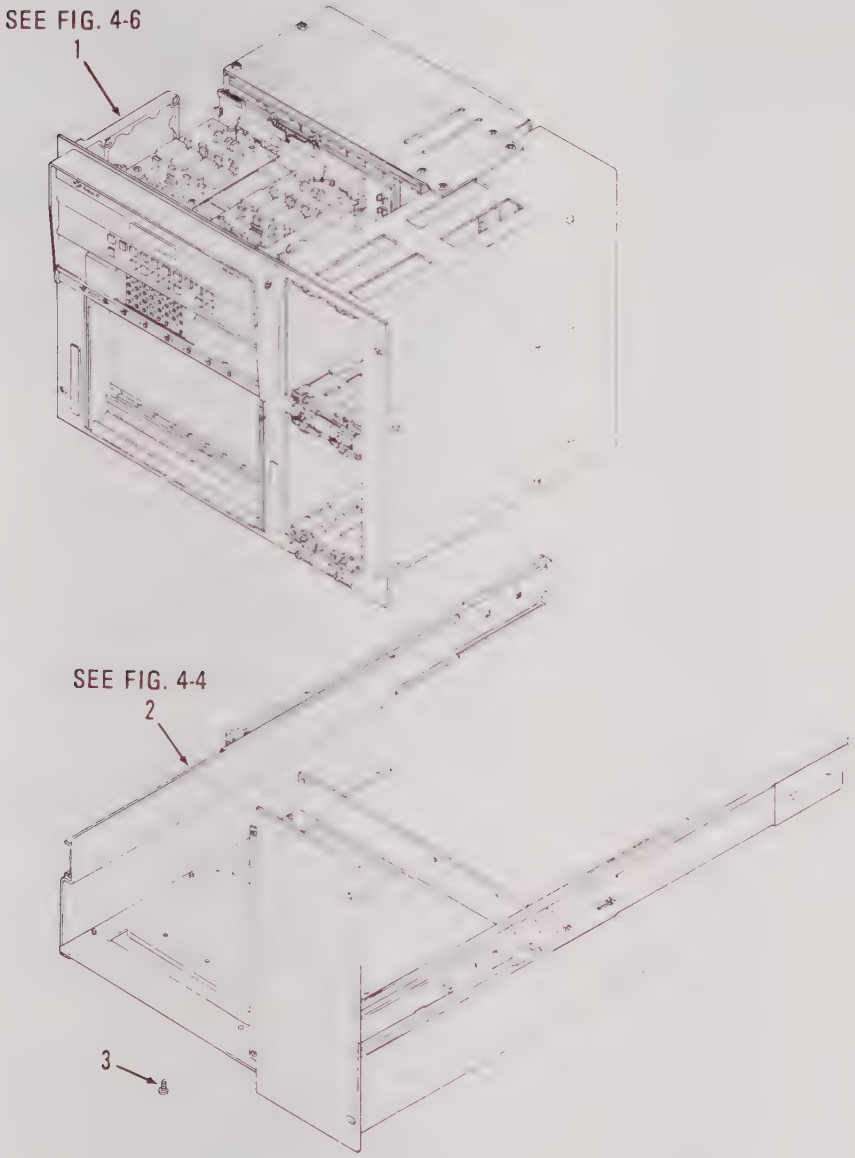


FIGURE 4-3 RACK MOUNTED RS 3200 SERIES RECORDER

RS 3400 & RS 3200 THERMAL RECORDER
RECORDER RACK MOUNTING ASSEMBLY
FIGURE 4-4

ITEM NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6	USED ON
	35-V8404-11	Recording System, Thermal, 4-50 mm, Rack Mount (RS 3400)	K
	35-V8420-11	Recording System, Thermal, 2-100 mm, Rack Mount (RS 3400)	L
	35-V8412-11	Recording System, Thermal, 2-50 mm, 1-100 mm, Rack Mount (RS 3400)	M
	35-V8202-11	Recording System, Thermal, 2-50 mm, Rack Mount (RS 3200)	N
	35-V8210-11	Recording System, Thermal, 1-100 mm, Rack Mount (RS 3200)	P
1	35-V8404-00	Recorder, Thermal, 4-50 mm (RS 3400) (See Fig. 4-6)	K
	35-V8420-00	Recorder, Thermal, 2-100 mm (RS 3400) (See Fig. 4-6)	L
	35-V8412-00	Recorder, Thermal, 2-50 mm, 1-100 mm (RS 3400) (See Fig. 4-6)	M
1	35-V8202-00	Recorder, Thermal, 2-50 mm (RS 3200) (See Fig. 4-6)	N
	35-V8210-00	Recorder, Thermal, 1-100 mm (RS 3200) (See Fig. 4-6)	P
	11-1202-39	Kit Assy., Rack Mounting (RS 3400)	KLM
	11-1202-40	Kit Assy., Rack Mounting (RS 3200)	NP
2	CL-210430-0218	Screw, Panel, Pan Hd., 10-32 X 1-1/8 In. w/Nylon Washer	
3	CL-710949	Panel Assy., Filler (RS 3200)	NP
4	CL-310950	Bracket, Filler (RS 3200)	NP
5	243898-02	Nut, Assembled Lockwasher, No. 10-32	NP
6	13-262716-8206	Screw, Self-Tapping, Pan Hd., 8-32 x 3/8 In.	
7	CL-212961-1	Rivet, Plastic	
9	245244-02	Nut, Floating	
10	CL-711761	Plate, Shipping	
11	13-262716-0206	Screw, Self-Tapping, Pan Hd., 10-32 x 3/8 In.	
12	CL-811717-1	Slide Assy., Right	
13	13-119924-0206	Screw, Self-Tapping, Hex Hd., 10-32 x 3/8 In.	
14	1-118195-309	Washer, Plain, No. 10	
15	10-120053-106	Lockwasher, Ext. Tooth, 1/4 In.	
16	13-262716-8206	Screw, Self-Tapping, Pan Hd., 8-32 x 3/8 In.	
17	CL-811718	Slide Assy., Left	
18	CL-410807	Saddle	

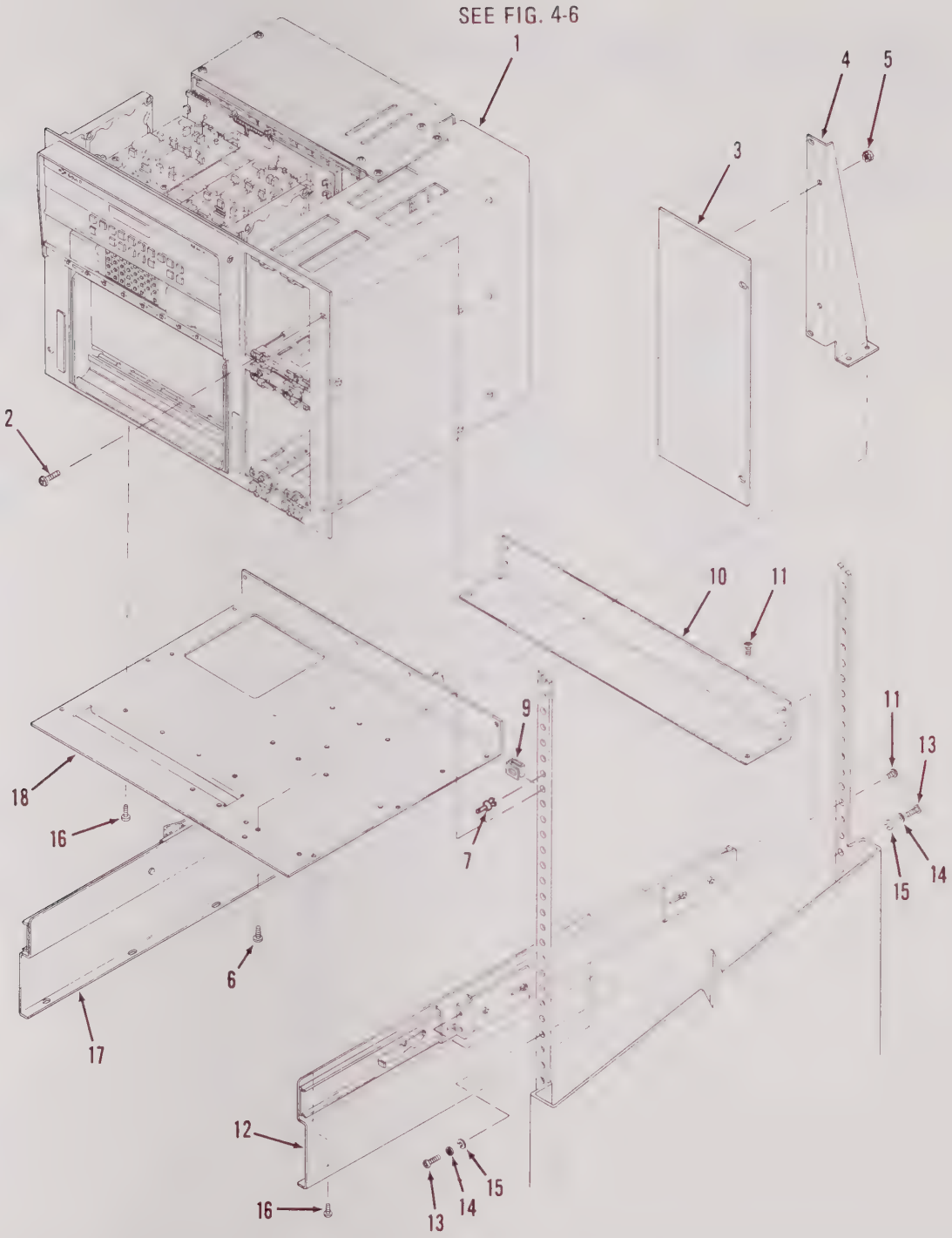


FIGURE 4-4 RS 3400 & RS 3200 SERIES RECORDER RACK MOUNTING ASSEMBLY

RS 3400 & RS 3200 THERMAL RECORDER
PORTABLE ENCLOSURE ASSEMBLY
FIGURE 4-5

ITEM NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6	USED ON
	CL-811054-1	Enclosure Assy., Portable (RS 3400)	KLMP
	CL-811055-1	Enclosure Assy., Portable (RS 3200)	N
1	CL-411990	Cover (RS 3400)	KLMP
1	Cl-412044	Cover (RS 3200)	N
2	16-249616-8208	Screw, Machine, Pan Hd., Painted, 8-32 x 1/2 In.	
3	CL-811996	Brace Assy.	
4	13-262715-8206	Screw, Self-Tapping, Flat Hd., 8-32 x 3/8 In.	
5	CL-311192	Support (RS 3400)	KLMP
6	21-119918-0408	Screw, Pan Hd., 10-24 x 1/2 In.	KLMP
7	230820-2	Plastic, Open-Cell, Adhesive	
8	CL-411995	Plate, Back (RS 3400)	KLMP
8	CL-312041	Plate, Back (RS 3200)	N
9	21-119918-0408	Screw, Pan Hd., 10-24 x 1/2 In.	
10	245244-02	Nut, Floating	
11	CL-811038	Bezel Assy. (RS 3400)	KLMP
11	CL-811067	Bezel Assy. (RS 3200)	N
12	CL-811053	Handle	
13	13-262715-0212	Screw, Self-Tapping, Flat Hd., 10-32 x 3/4 In.	
14	CL-411051	Cover, Side	
15	13-262716-8204	Screw, Self-Tapping, Pan Hd., 8-32 x 1/4 In.	
16	266107-2	Bail Assy. (Feet)	
17	13-262716-6206	Screw, Self-Tapping, Pan Hd., 6-32 x 3/8 In.	
18	CL-412765	Base (RS 3400)	KLMP
18	CL-412766	Base (RS 3200)	N
19	13-262716-8206	Screw, Self-Tapping, Pan Hd., 8-32 x 3/8 In.	

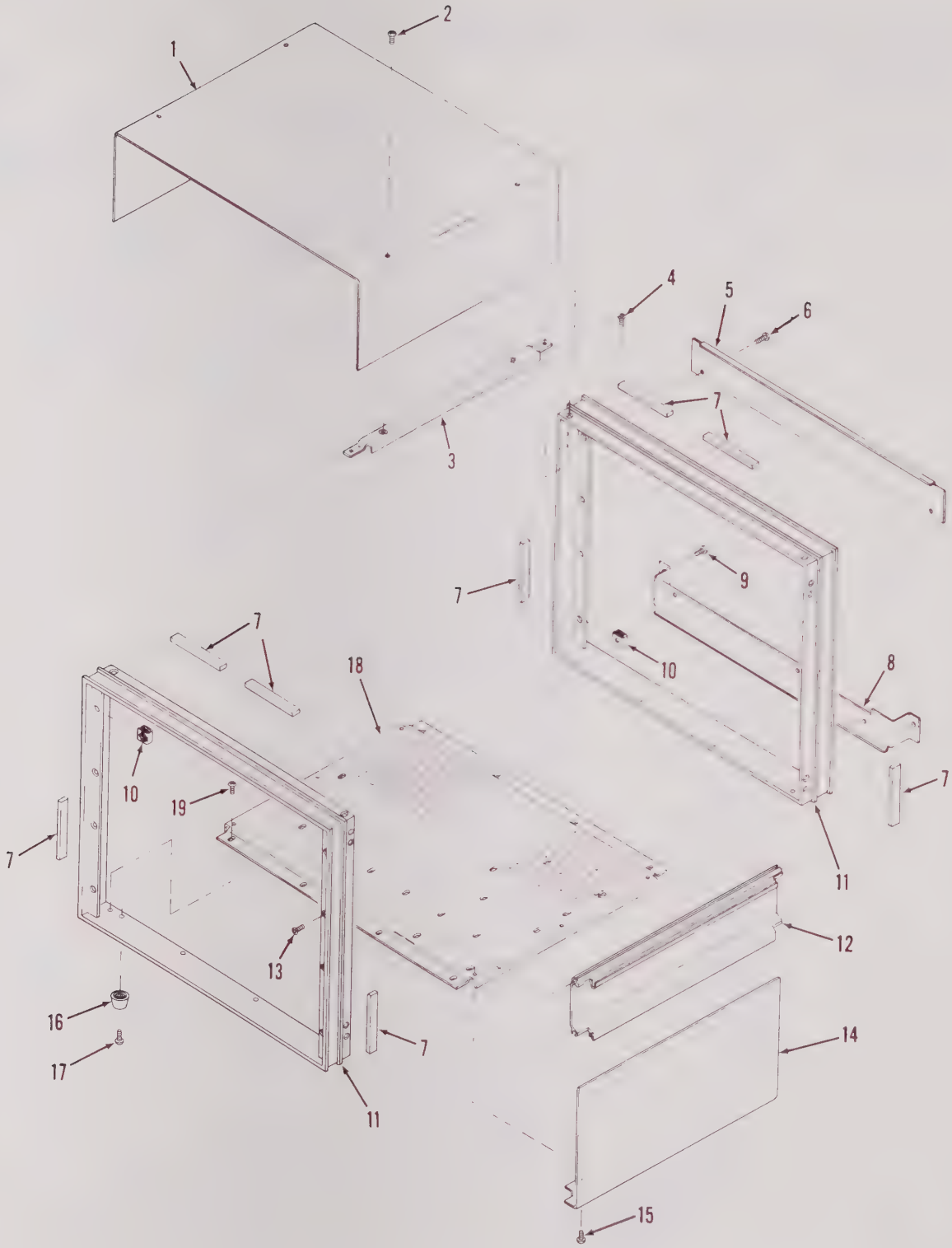


FIGURE 4-5 PORTABLE ENCLOSURE ASSEMBLY

RS 3400 & RS 3200 THERMAL RECORDER
RECORDER ASSEMBLY
FIGURE 4-6

ITEM NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6	USED ON
	35-V8404-00	Recorder, Thermal, 4-50 mm (RS 3400)	K
	35-V8420-00	Recorder, Thermal, 2-100 mm (RS 3400)	L
	35-V8412-00	Recorder, Thermal, 2-50 mm, 1-100 mm (RS 3400)	M
	35-V8202-00	Recorder, Thermal, 2-50 mm (RS 3200)	N
	35-V8210-00	Recorder, Thermal, 1-100 mm (RS 3200)	P
1	CL-813232	Control Panel Assy., 4-50 mm (RS 3400) (See Fig. 4-15)	K
1	CL-813253	Control Panel Assy., 2-100 mm (RS 3400) (See Fig. 4-15)	L
1	CL-813252	Control Panel Assy., 2-50 mm, 1-100 mm (RS 3400) (See Fig. 4-15)	M
1	CL-813285	Control Panel Assy., 2-50 mm (RS 3200) (See Fig. 4-15)	N
1	CL-813286	Control Panel Assy., 1-100 mm (RS 3200) (See Fig. 4-15)	P
2	CL-211573	Latch	KLMN
2	CL-210539	Latch	P
3	13-131131-6206	Screw, Self-Tapping, Flat Hd., 6-32 x 3/8 In.	
4	CL-211572	Nut, Pivot	KLMN
4	CL-210537	Nut, Pivot	P
5	CL-213073	Bushing, Pivot	
6	31-119918-4004	Screw, Pan Hd., 4-40 x 1/4 In.	
7	Not Procurable	Transport and Pen Bar Assy. (See Fig. 4-7)	
8	CL-610559	Cable Assy., Penmotor	
9	Not Procurable	PC Board and Card Cage Assy. (See Figs. 4-17 and 4-18)	
10	13-262716-8206	Screw, Self-Tapping, Pan Hd., 8-32 x 3/8 In.	
11	CL-710520-1	Cable Assy., Flat	
12	CL-710731-1	Cable, Flat	
13	CL-811646-1	Enclosure Assy. (RS 3400) (See Fig. 4-16)	KLM
13	CL-811643-1	Enclosure Assy. (RS 3200) (See Fig. 4-16)	NP
14	398035	Nut, Channel	NP
16	13-262715-8224	Screw, Self-Tapping, Flat Hd., 8-32 x 1-1/2 In.	
17	CL-610820	Ejector Assy.	
18	CL-710826	Front Panel & Bezel Assy. (RS 3400) (See Fig. 4-14)	KLM
18	CL-710827	Front Panel & Bezel Assy. (RS 3200) (See Fig. 4-14)	NP
19	243898-02	Nut, Assembled Lockwasher, No. 10-32	

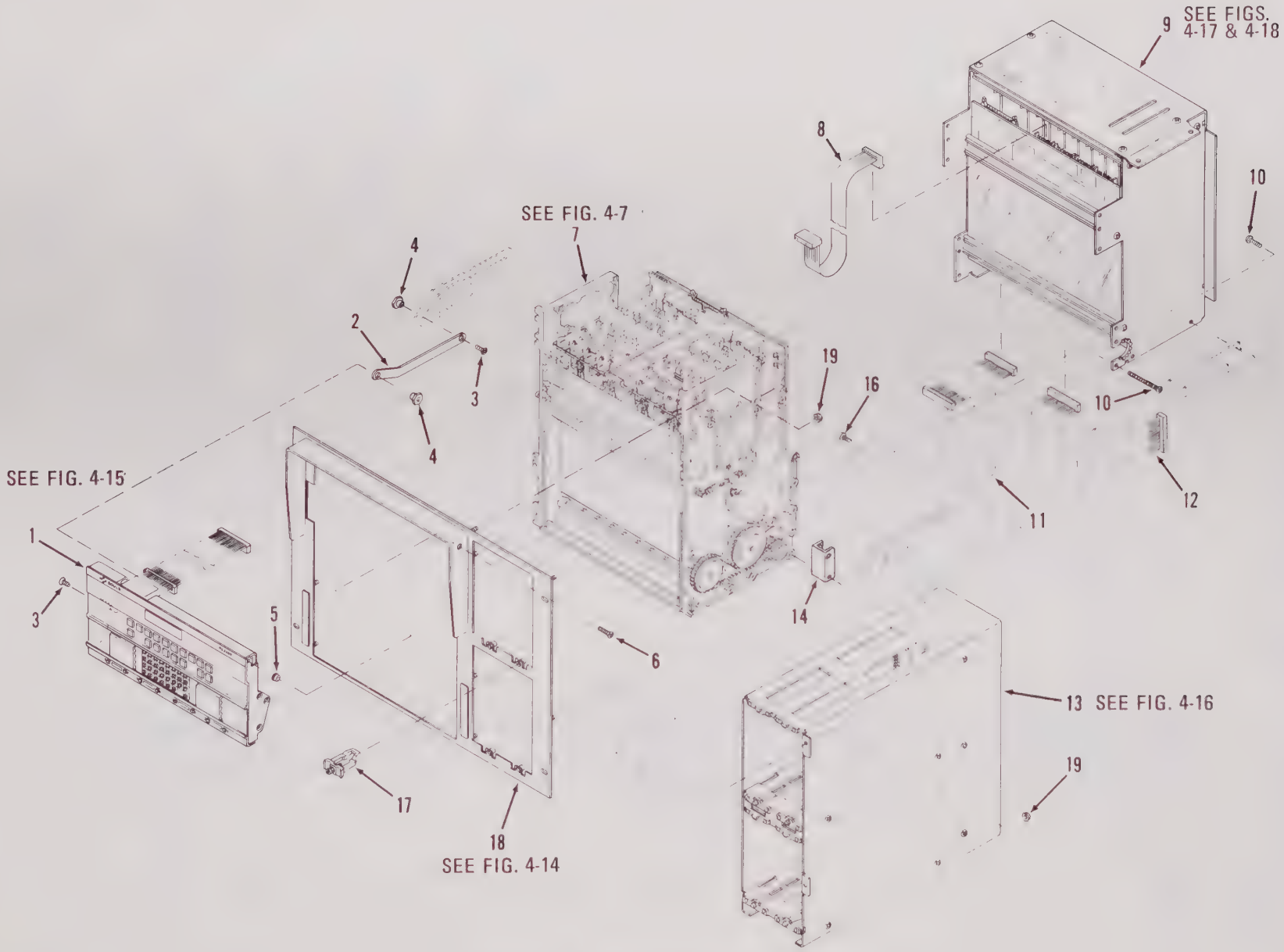


FIGURE 4-6 RECORDER ASSEMBLY

RS 3400 & RS 3200 THERMAL RECORDER
TRANSPORT, PEN BAR AND WRITING TABLE ASSEMBLY
FIGURE 4-7

ITEM NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6	USED ON
	Not Procurable	Transport and Pen Bar Assy., 4-50 mm (RS 3400)	K
	Not Procurable	Transport and Pen Bar Assy., 2-100 mm (RS 3400)	L
	Not Procurable	Transport and Pen Bar Assy., 2-50 mm, 1-100 mm (RS 3400)	M
	Not Procurable	Transport and Pen Bar Assy., 2-50 mm (RS 3200)	N
	Not Procurable	Transport and Pen Bar Assy., 1-100 mm (RS 3200)	P
1	CL-710552	Pen Assy., Thermal, 40/50 mm (4 Required) (Replacement Pen Kit 11-2824-3A)	K
1	CL-710552	Pen Assy., Thermal, 40/50 mm (2 Required) (Replacement Pen Kit 11-2824-3A)	MN
1	CL-710553	Pen Assy., Thermal, 80/100 mm (2 Required) (Replacement Pen Kit 11-2824-4A)	L
1	CL-710553	Pen Assy., Thermal, 80/100 mm (1 Required) (Replacement Pen Kit 11-2824-4A)	MP
2	31-119917-0005	Screw, Machine, Fillister Hd., 0-80 x 5/16 In.	
3	CL-211269	Clamp, Pen	
4	285266-1	Spacer	
5	*CL-810819-3	Pen Bar Assy., Thermal (See Fig. 4-11)	K
5	*CL-810819-5	Pen Bar Assy., Thermal (See Fig. 4-11)	L
5	*CL-810819-4	Pen Bar Assy., Thermal (See Fig. 4-11)	M
5	*CL-810822-2	Pen Bar Assy., Thermal (See Fig. 4-11)	N
5	*CL-810822-3	Pen Bar Assy., Thermal (See Fig. 4-11)	P
6	13-262715-8214	Screw, Self-Tapping, Flat Hd., 6-32 x 5/8 In.	
7	13-262716-8214	Screw, Self-Tapping, Pan Hd., 6-32 x 5/8 In.	
8	CL-811658-1	Transport Assy., Thermal (RS 3400) (See Fig. 4-8)	KLM
8	CL-811659-1	Transport Assy., Thermal (RS 3200) (See Fig. 4-8)	NP
9	297732-2	Rod, Tension (RS 3400)	KLM
9	297732-3	Rod, Tension (RS 3200)	NP
10	240704-2	Nut, Self-Locking	
11	297739	Stud, Spring	
12	2-240031-21	Spring, Extension	
13	397740	Stud, Rod	
14	Not Procurable	Fan Fold Paper Tray Assy. (RS 3400) (See Fig. 4-13)	KLM
14	Not Procurable	Fan Fold Paper Tray Assy. (RS 3200) (See Fig. 4-13)	NP
15	13-262715-8212	Screw, Self-Tapping, Flat Hd., 8-32 x 3/4 In.	
16	CL-710420-2	Pen Guard (RS 3400)	KLM
16	CL-710420-3	Pen Guard (RS 3200)	NP
17	CL-810536-5	Table Assy., Writing (RS 3400) (See Fig. 4-12)	KLM
17	CL-810536-6	Table Assy., Writing (RS 3200) (See Fig. 4-12)	NP
18	CL-210327	Screw, Dog, Eccentric	
19	CL-210330	Nut	
20	CL-710359	Plug Assy., Core, Right	
21	397737	Plug Core, Left	
22	CL-210811-1	Fastener, Scotchmate	

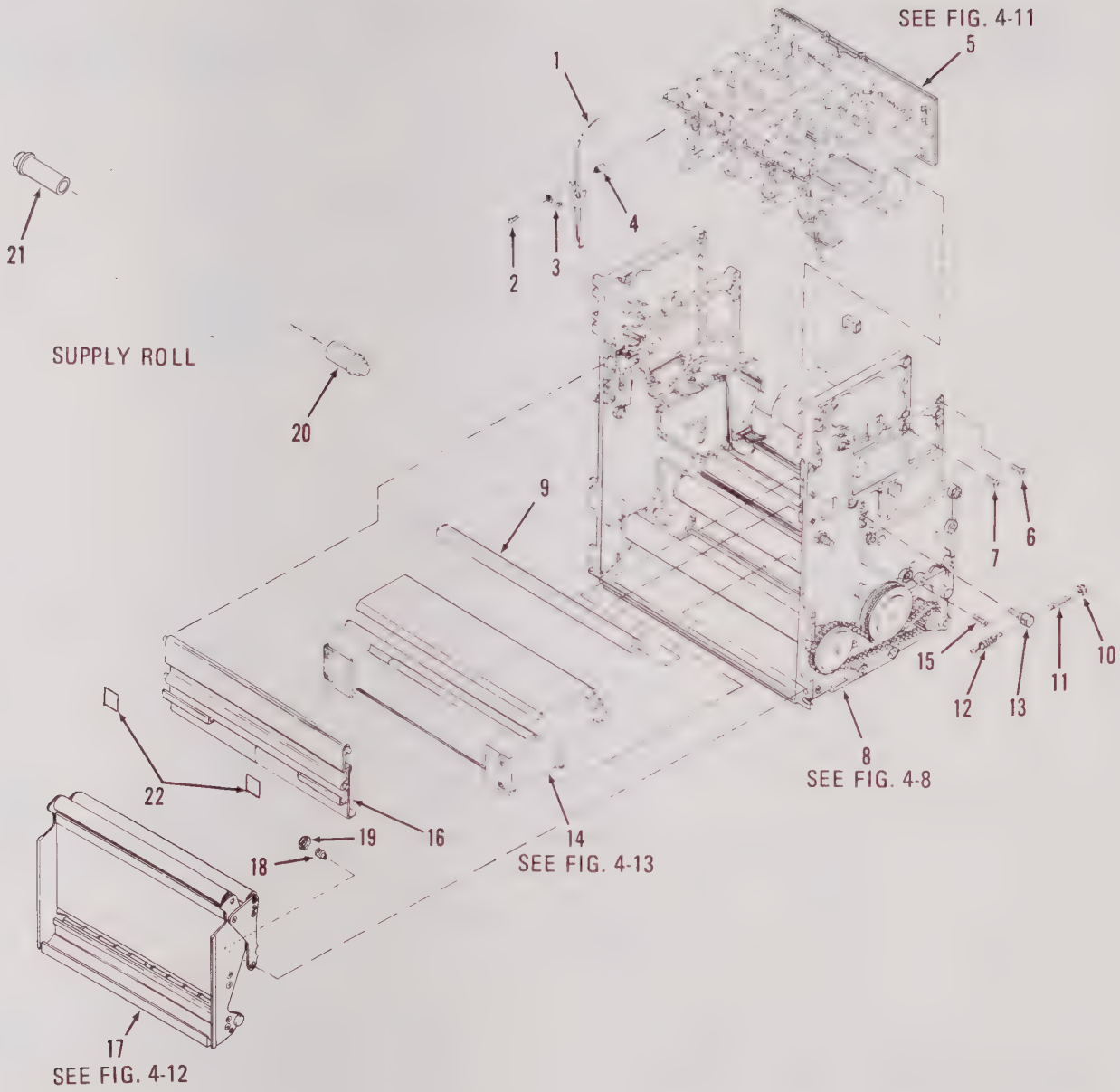


FIGURE 4-7 TRANSPORT, PEN BAR AND WRITING TABLE ASSEMBLY

RS 3400 & RS 3200 THERMAL RECORDER
TRANSPORT ASSEMBLY
FIGURE 4-8

ITEM NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6	USED ON
	*CL-811658-1	Transport Assy. (RS 3400)	KLM
	*CL-811659-1	Transport Assy. (RS 3200)	NP
1	CL-310524	Wing, Left	
2	CL-310916	Bracket, Sensor	
3	13-262716-8214	Screw, Self-Tapping, Pan Hd., 8-32 x 7/8 In.	
4	• CL-610338	Cable Assy., Monitor	
	*CL-711716	Annotation Assy., Left	
5	**31-121166-2602	Screw, Set, Socket Hd., Cup Point, 2-56 x 1/8	
6	1-264521-16	Spring	
7	31-119922-2610	Screw, Cap, Socket Hd., 2-56 x 5/8 In.	
8	**1-240031-20	Spring, Extension	
9	**CL-210473	Collar	
10	CL-410493	Arm, Annotation	
11	CL-610594	Head & Arm Assy.	
12	1-118195-302	Washer, Plain, No. 1	
13	31-119918-2605	Screw, Pan Hd., 2-56 x 5/16 In.	
14	897912	Cable Assy., Paper Sensor	
15	CL-210245	Spacer, Rubber	
16	298042	Sensor	
17	797724-2	Cover, Modified (RS 3400)	KLM
17	797724-3	Cover, Modified (RS 3200)	NP
18	13-262715-8212	Screw, Self-Tapping, Flat Hd., 8-32 x 3/4 In.	
19	CL-811566-1	Plate Assy., Right Side (See Fig. 4-9)	
22	265741-1	Bearing, Ball	
23	127271	Washer, Bronze, Phosphor, 0.257 In. ID x 0.38 In. OD	
24	2-240731-10	Ring, Retaining, External	
25	• 694520-1	Pulley Assy., 32 Teeth	
26	+297805-1	Belt, Dual	
26A	#297805-5	Belt, Dual	
27	694520	Pulley Assy., 30 Teeth	
28	297910	Collar, Spacer	

** Not Included with Annotation Assy., CL-711716
+ Used on Recorders Manufactured through 1989
# Used on Recorders Manufactured after 1989
• Omitted on Recorders Manufactured after 1989

RS 3400 & RS 3200 THERMAL RECORDER TRANSPORT ASSEMBLY (Cont.) FIGURE 4-8

ITEM NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6	USED ON
29	CL-211466	Spacer, Wire	
30	CL-810240	Board Assy., Paper Out Sensor (See Fig. 4-35)	
31	31-119918-4004	Screw, Pan Hd., 4-40 x 1/4 In.	
	*697788	Motor Assy., Stepper	
32	CL-210980	Motor, Stepper	
33	31-262716-8206	Screw, Self-Tapping, Pan Hd., 8-32 x 3/8 In.	
34	697648	Mount Assy., Motor	
35	694166-1	Damper Assy.	
36	397869-2	Roll, Drive (RS 3400)	KLM
36	397869-3	Roll, Drive (RS 3200)	NP
37	CL-210659	Transformer	
38	13-262716-8204	Screw, Self-Tapping, Pan Hd., 8-32 x 1/4 In.	
39	397721	Cam, Pressure Roll	
	797695-2	Chute, Modified (RS 3400)	KLM
40	797695-3	Chute, Modified (RS 3200)	NP
41	13-262715-8212	Screw, Self-Tapping, Flat Hd., 8-32 x 3/4 In.	
42	267426-2	Deflector, Paper (RS 3400)	KLM
42	267426-3	Deflector, Paper (RS 3200)	NP
43	CL-811567-1	Plate Assy., Left Side (See Fig. 4-10)	
44	232997-23	Strap, Retaining Cable	
45	•CL-710336	Wheel Assy., Timing	
46	+CL-810290	Board Assy., Speed Monitor (See Fig. 4-36)	
46A	#CL-713429	Speed Monitor Assy.	
47	•13-262716-8206	Screw, Self-Tapping, Pan Hd., 8-32 x 3/8 In.	
48	• 243898-82	Nut, Assembled Lockwasher, No. 8-32	
49	• CL-311883-2	Shaft, N.R., (RS 3400)	KLM
49	• CL-311883-3	Shaft, N.R., (RS 3200)	NP
50	#13-262716-8206	Screw, Self-tapping, Pan Hd., 8-32 x 3/8 In.	
51	#270903-6	Clamp	
52	#CL-213353	Timing	

\+ Used on Recorders Manufactured through 1989
\# Used on Recorders Manufactured after 1989
• Omitted on Recorders Manufactured after 1989

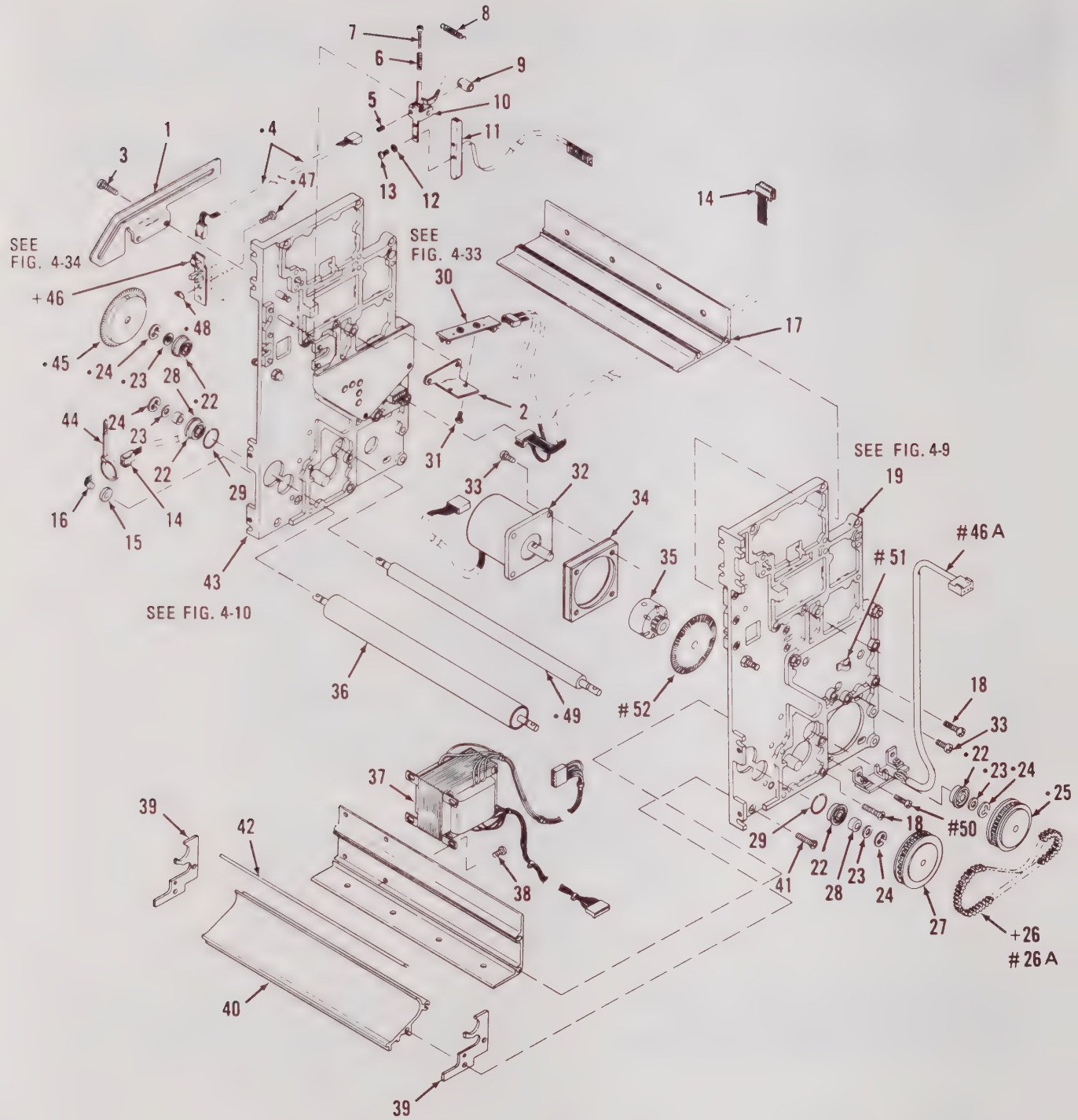


FIGURE 4-8 TRANSPORT ASSEMBLY

RS 3400 & RS 3200 THERMAL RECORDER
SIDE PLATE ASSEMBLY, RIGHT
FIGURE 4-9

ITEM NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6	USED ON
	CL-811566-1	Side Plate Assy., Right	
1	797625-1	Guide Assy., Right	
2	243898-82	Nut, Assembled Lockwasher, No. 8-32	
3	CL-413000	Side Plate, Front Right	
4	397640	Catch, Cover	
5	13-262715-8206	Screw, Self-Tapping, Flat Hd., 8-32 x 3/8 In.	
6	1-264521-19	Spring	
7	CL-312440	Support Plug	
8	31-119923-0204	Screw, Set, 10-32 x 1/4 In.	
9	17-119914-5008	Screw, Pan Hd., 5-40 x 1/2 In.	
10	1-210761-6	Bearing, No. 7, 1/16 In. Dia.	
11	CL-212895	Washer, 0.070 In. Thick	
12	CL-212894	Pin	

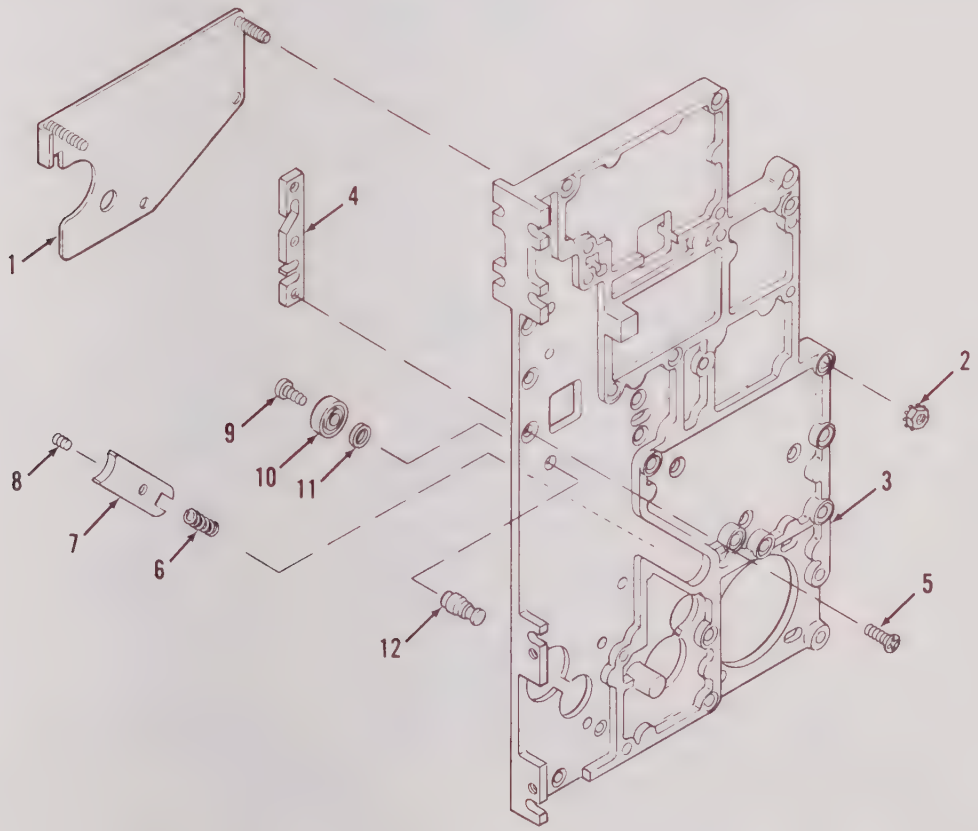


FIGURE 4-9 RIGHT HAND SIDE PLATE ASSEMBLY

RS 3400 & RS 3200 THERMAL RECORDER
SIDE PLATE ASSEMBLY, LEFT
FIGURE 4-10

ITEM NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6	USED ON
	CL-811567-1	Side Plate Assy., Left	
1	265874-3	Pin, Spring	
2	CL-211563	Pin, Annotation Support	
3	797626-2	Guide Assy., Left	
4	243898-82	Nut, Assembled Lockwasher, No. 8-32	
5	897635	Board Assy., Chart Supply Sensor (See Fig. 4-20)	
6	397640	Catch, Cover	
7	13-262715-8206	Screw, Self-Tapping, Flat Hd., 8-32 x 3/8 In.	
8	CL-413001	Side Plate, Front Left	
9	CL-212894	Pin	
10	CL-212895	Washer, 0.070 In. Thick	
11	1-210761-6	Bearing, No. 7, 1/16 In., Dia.	
12	17-119914-5008	Screw, Pan Hd., 5-40 x 1/2 In.	
13	1-264521-19	Spring	
14	CL-312440	Support Plug	
15	31-119923-0204	Screw, Set, 10-32 x 1/4 In.	

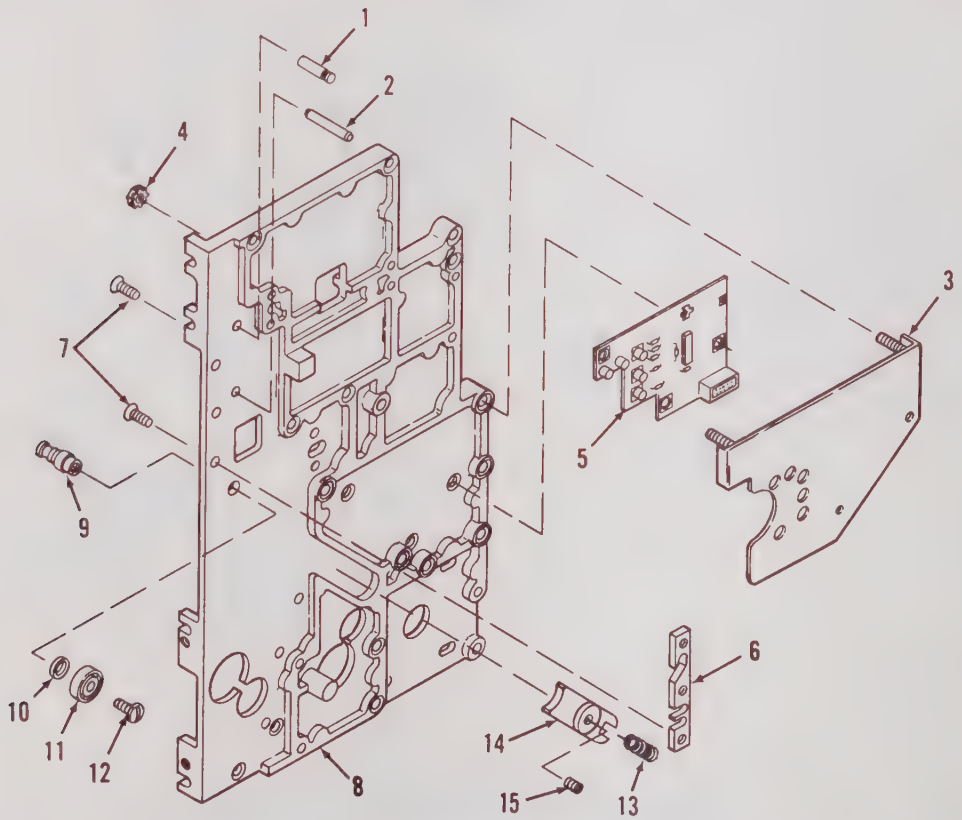


FIGURE 4-10 LEFT HAND SIDE PLATE ASSEMBLY

RS 3400 & RS 3200 THERMAL RECORDER
PEN BAR ASSEMBLY
FIGURE 4-11

ITEM NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6	USED ON
	CL-810819-3	Pen Bar Assy., Thermal, 4-50 mm (RS 3400)	K
	CL-810819-5	Pen Bar Assy., Thermal, 2-100 mm (RS 3400)	L
	CL-810819-4	Pen Bar Assy., Thermal, 2-50 mm, 1-100 mm (RS 3400)	M
	CL-810822-2	Pen Bar Assy., Thermal, 2-50 mm (RS 3200)	N
	CL-810822-3	Pen Bar Assy., Thermal, 1-100 mm (RS 3200)	P
1	897809-1	Board Assy., Pen Heat (See Fig. 4-29)	
2	13-262716-6212	Screw, Self-Tapping, Pan Hd., 6-32 x 3/4 In.	
3	249438-13	Washer, Spacer, Nylon	
4	897812-1	Board Assy., Mother-In-Law (RS 3400) (See Fig. 4-31)	KLM
4	897811-1	Board Assy., Mother-In-Law (RS 3200) (See Fig. 4-30)	NP
5	CL-310958-2	Shield, Board (RS 3400)	KLM
5	CL-310958-3	Shield, Board (RS 3200)	NP
6	13-262716-8212	Screw, Self-Tapping, Pan Hd., 8-32 x 3/4 In.	
7	297915-2	Washer, Spacer, Nylon, 0.375 In. Thk, 0.190 In. ID x 1/2 In. OD	
8	CL-811348	Board Assy., Lead Retainer (See Fig. 4-44)	L
9	13-262716-6212	Screw, Self-Tapping, Pan Hd., 6-32 x 3/4 In.	
10	249438-13	Washer, Spacer, Nylon	
11	CL-810172	Bar, Penmotor Mounting (RS 3400)	KLM
11	CL-710173	Bar, Penmotor Mounting (RS 3200)	NP
12	14-119923-0416	Screw, Set, Hex. Socket, Cup Point, 10-24 x 1 In.	KN
12	14-119923-0424	Screw, Set, Hex. Socket, Cup Point, 10-24 x 1-1/2 In.	LMP
13	CL-710145	Event Marker Assy., 50/100 mm	
14	267272-2	Washer, Flat	
15	31-119917-0003	Screw, Machine, Fillister Hd., 0-80 x 3/16 In.	
16	1-118195-303	Washer, Plain, No. 2	
17	1-216741-401	Lockwasher, Spring, Plain, No. 2	
18	31-119918-2605	Screw, Pan Hd., 2-56 x 5/16 In.	
19	CL-212966	Shield, Penmotor	KMN
20	1-216741-402	Lockwasher, Spring	KMN
21	31-119998-26	Nut, Hexagon	KMN
22	CL-310935	Bracket, Tip Support, Left	KMN
23	1-216741-401	Lockwasher, Spring, Plain, No. 2	KMN
24	31-119918-2605	Screw, Pan Hd., 2-56 x 5/16 In.	KMN
25	896683	Penmotor Assy., 50 mm	KMN
26	1-118195-307	Washer, Plain, No. 8	
27	1-216741-425	Lockwasher, Spring, Copper, No. 8	

RS 3400 & RS 3200 THERMAL RECORDER
PEN BAR ASSEMBLY (cont.)
FIGURE 4-11

ITEM NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6	USED ON
28	31-119922-8206	Screw, Cap, Hex Socket Hd., 8-32 x 3/8 In.	
29	267426-8	Deflector, Paper (RS 3400)	KLM
29	267426-9	Deflector, Paper (RS 3200)	NP
30	CL-710551	Pen Assy., Event, Thermal (Replacement Kit 11-2874-2A)	
31	CL-610915-1	Bracket Assy., Tip Support	LMP
32	CL-610211	Saddle, Penmotor	LMP
33	CL-810229	Penmotor Assy., 80/100 mm	LMP
35	CL-211762	Shield, Penmotor	LMP
36	31-119918-8203	Screw, Pan Hd., 8-32 x 3/16 In.	LMP
37	CL-310470	Bracket	LMP
38	31-119922-8214	Screw, Cap, Hex Socket Hd., 8-32 x 7/8 In.	LMP
39	1-216741-425	Lockwasher, Spring, Copper No. 8	LMP
40	1-118195-307	Washer, Plain, No. 8	LMP
41	CL-611435	Block Assy.	M
42	31-119922-8214	Screw, Cap, Hex Socket Hd., 8-32 x 7/8 In.	M
43	1-216741-425	Lockwasher, Spring, Copper No. 8	M
44	1-118195-307	Washer, Plain, No. 8	M

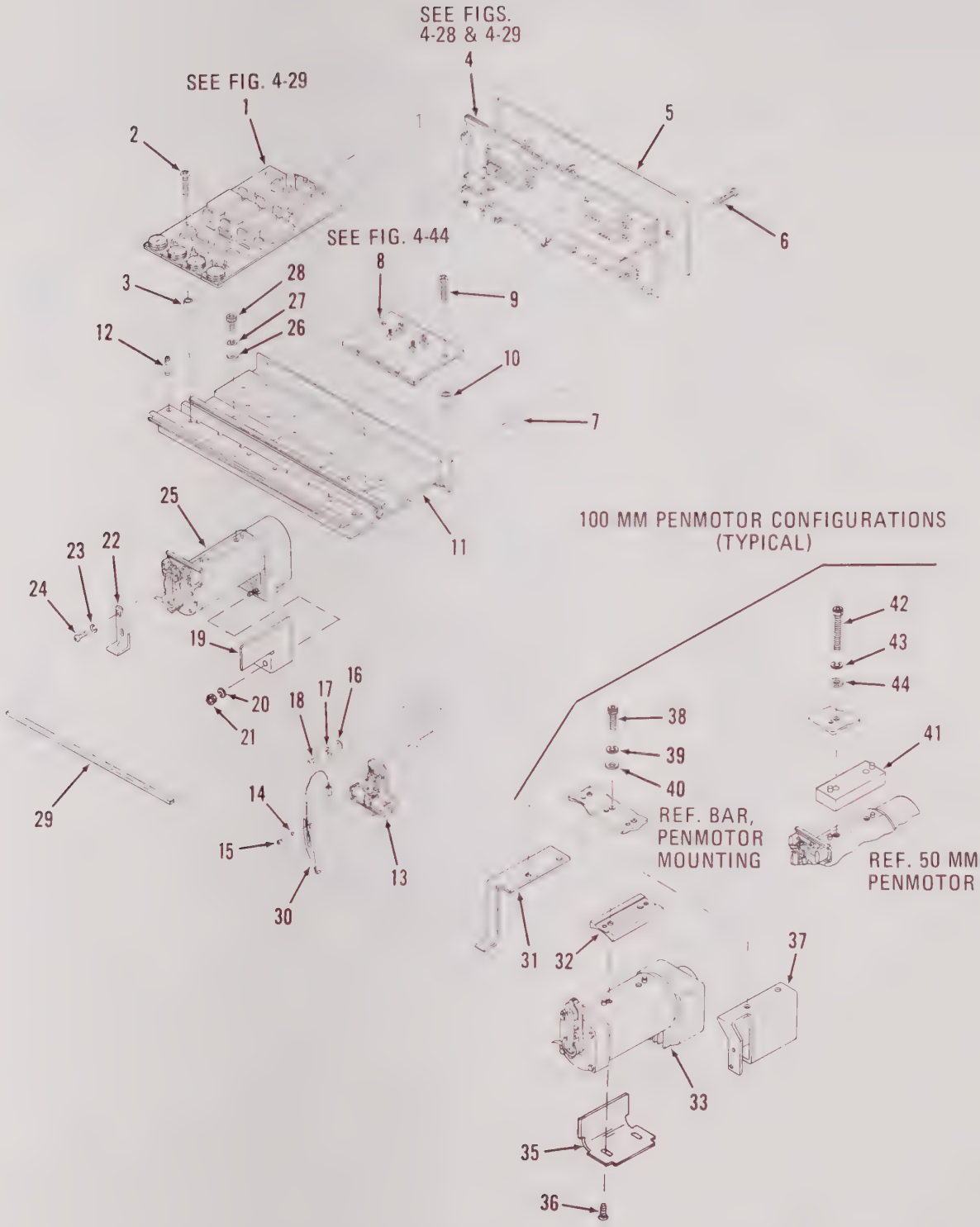


FIGURE 4-11 THERMAL PEN BAR ASSEMBLY

RS 3400 & RS 3200 THERMAL RECORDER
WRITING TABLE ASSEMBLY
FIGURE 4-12

ITEM NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6	USED ON
	CL-810536-5	Table Assy., Writing, Thermal (RS 3400)	KLM
	CL-810536-6	Table Assy., Writing, Thermal (RS 3200)	NP
1	697860	Link Assy., Left	
2	127271	Washer, Bronze, Phosphor, 0.257 In. ID x 0.38 In. OD	
3	1-210761-6	Bearing, Ball	
4	CL-213171-2	Roll, Rubber (RS 3400)	KLM
4	CL-213171-3	Roll, Rubber (RS 3200)	NP
5	CL-210102-2	Tie Bar (RS 3400)	KLM
5	CL-210102-3	Tie Bar (RS 3200)	NP
6	697859	Link Assy., Right	
7	13-262715-6206	Screw, Self-Tapping, Flat Hd., 6-32 x 3/8 In.	
	CL-710532-1	Support Assy., Right	
8	897866	Support, Right	
9	297858	Support, Bearing	
10	297638	Nut, Stud, 0.250-32 UNEF-2B	
11	CL-210183-0206	Screw, Cap, Low Hd. Socket, 10-32 x 3/8 In.	
12	13-262715-6206	Screw, Self-Tapping, Flat Hd., 6-32 X 3/8 In.	
13	243867-1	"O" Ring	
14	1-297841-10	Ball Plunger	
15	797851-2	Bar, Pull (RS 3400)	KLM
15	797851-3	Bar, Pull (RS 3200)	NP
16	397790	Roll, Pressure (RS 3400)	KLM
16	CL-311339	Roll, Pressure (RS 3200)	NP
17	CL-710402-2	Bar, Writing (RS 3400)	KLM
17	CL-710402-3	Bar, Writing (RS 3200)	NP
	CL-710533-1	Support Assy., Left	
18	CL-810407	Support, Left	
19	297858	Support, Bearing	
20	297638	Nut, Stud, 0.250-32 UNEF-2B	
21	13-262715-6206	Screw, Self-Tapping, Flat Hd., 6-32 x 3/8 In.	
22	CL-211232-2	Roll, Rubber (RS 3400)	KLM
22	CL-211232-3	Roll, Rubber (RS 3200)	NP
23	CL-212539	Guide, Edge	
24	31-119920-6203	Screw, Machine, Flat Hd., 6-32 x 3/16 In.	

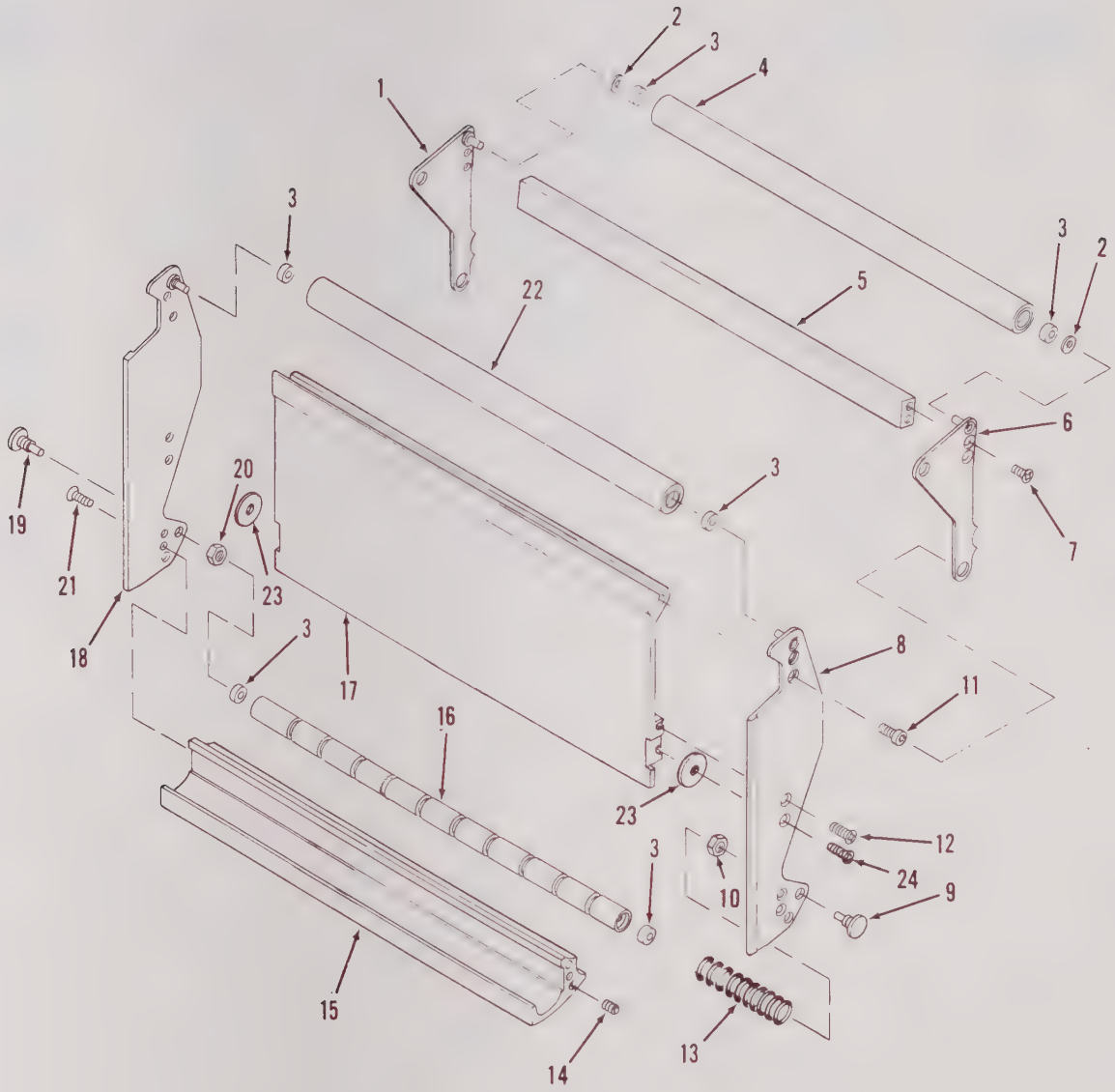


FIGURE 4-12 WRITING TABLE ASSEMBLY

RS 3400 & RS 3200 THERMAL RECORDER
FAN FOLD PAPER TRAY ASSEMBLY
FIGURE 4-13

ITEM NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6	USED ON
	Not Procurable	Fan Fold Paper Tray Assy. (RS 3400)	KLM
	Not Procurable	Fan Fold Paper Tray Assy. (RS 3200)	NP
1	CL-210142-2	Bail (RS 3400)	KLM
1	CL-210142-3	Bail (RS 3200)	NP
2	243855-1	Ball Plunger	
3	CL-310221-2	Deflector, Fan Fold (RS 3400)	KLM
3	CL-310221-3	Deflector, Fan Fold (RS 3200)	NP
4	31-119918-8203	Screw, Pan Hd., 8-32 x 3/16 In.	
5	797946-2	Tray, Stationary (RS 3400)	KLM
5	797946-3	Tray, Stationary (RS 3200)	NP
6	797945-2	Tray, Pivoting (RS 3400)	KLM
6	797945-3	Tray, Pivoting (RS 3200)	NP
7	CL-310094	Ear, Right	
8	31-119918-8203	Screw, Pan Hd., 8-32 x 3/16 In.	
9	CL-310095	Ear, Left	
10	297587-2	Pin, Hinge (RS 3400)	KLM
10	297587-3	Pin, Hinge (RS 3200)	NP

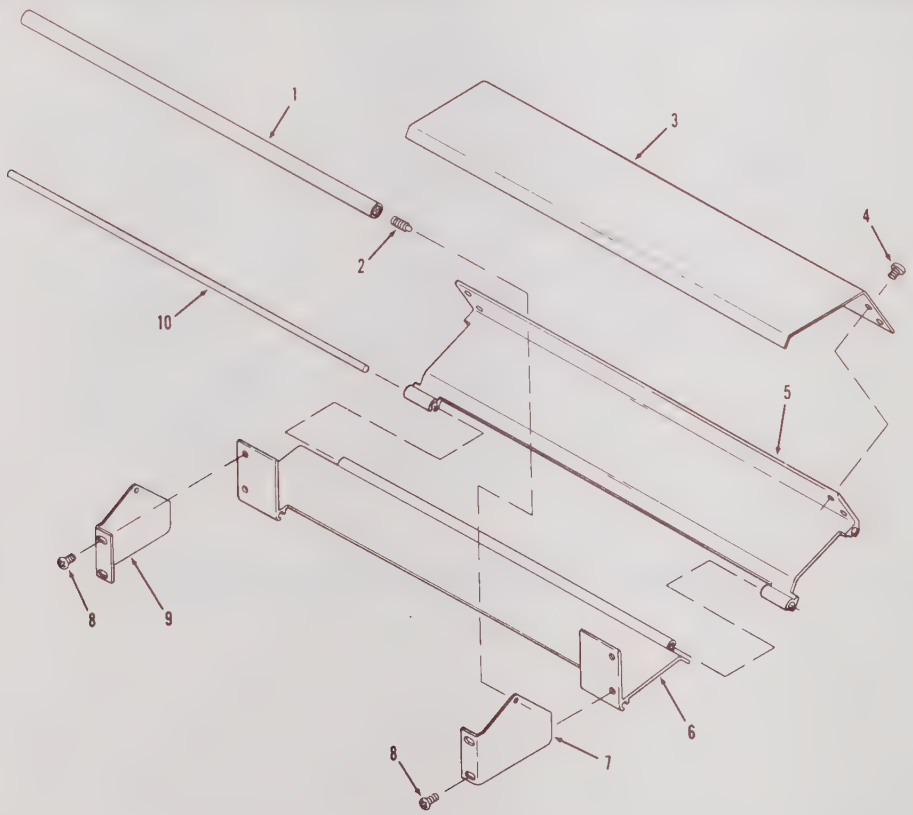


FIGURE 4-13 FAN FOLD PAPER TRAY ASSEMBLY

RS 3400 & RS 3200 THERMAL RECORDER
PANEL AND BEZEL ASSEMBLY
FIGURE 4-14

ITEM NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6	USED ON
	CL-710826	Front Panel & Bezel Assy. (RS 3400)	KLM
	CL-710827	Front Panel & Bezel Assy. (RS 3200)	NP
1	CL-413235	Bezel (RS 3400)	KLM
1	CL-413236	Bezel (RS 3200)	NP
2	13-262716-8204	Screw, Self-Tapping, Pan Hd., 8-32 x 1/4 In.	
3	CL-710812	Front Panel Assy. (RS 3400)	KLM
3	CL-710828	Front Panel Assy. (RS 3200)	NP
4	CL-310416	Cap, Panel	

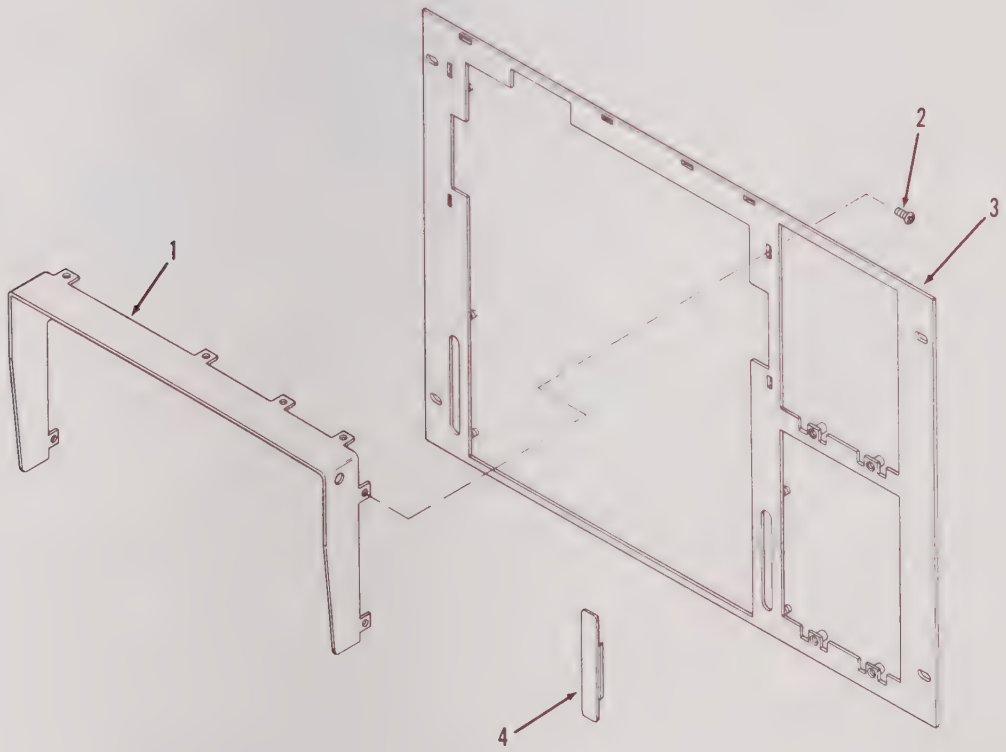


FIGURE 4-14 PANEL AND BEZEL ASSEMBLY

RS 3400 & RS 3200 THERMAL RECORDER
CONTROL PANEL ASSEMBLY
FIGURE 4-15

ITEM NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6	USED ON
	CL-813232	Control Panel Assy., 4-50 mm (RS 3400)	K
	CL-813253	Control Panel Assy., 2-100 mm (RS 3400)	L
	CL-813252	Control Panel Assy., 2-50 mm, 1-100 mm (RS 3400)	M
	CL-813285	Control Panel Assy., 2-50 mm (RS 3200)	N
	CL-813286	Control Panel Assy., 1-100 mm (RS 3200)	P
1	CL-713238	Enclosure Subassy., RS 3400	KLM
1	CL713240	Enclosure Subassy., RS 3200	NP
1	CL-413237	Enclosure, Control Panel, RS 3400	KLM
1	CL-413239	Enclosure, Control Panel, RS 3200	NP
1	2-129275-102	Nut, Clinch	
1	CL-213021-1	Spacer, Clinch	
2	CL-813230	Panel, Assy., Front, 4 Ch., 4-50 mm	K
2	CL-813248	Panel, Assy., Front, 4 Ch., 2-100 mm	L
2	CL-813244	Panel, Assy., Front, 4 Ch., 2-50 mm, 1-100 mm	M
2	CL-813249	Panel, Assy., Front, 2 Ch., 2-50 mm	N
2	CL-813256	Panel, Assy., Front, 2 Ch., 1-100 mm	P
2	CL-413231	Overlay, Control Panel, 4 Ch., 4-50 mm	K
2	CL-413251	Overlay, Control Panel, 4 Ch., 2-100 mm	L
2	CL-413245	Overlay, Control Panel, 4 Ch., 2-50 mm, 1-100 mm	M
2	CL-413255	Overlay, Control Panel, 2 Ch., 2-50 mm	N
2	CL-413257	Overlay, Control Panel, 2 Ch., 1-100 mm	P
2	CL-413026	Panel, Control, RS 3400	KLM
2	CL-413027	Panel, Control, RS 3200	NP
2	269247-10	Spacer, Threaded, Clinch	
3	CL-813157	P.C. Board Assy., Front Panel, RS 3400	KLM
3	CL-813158	P.C. Board Assy., Front Panel, RS 3200	NP
4	CL-412977	Pad, Pushbutton	
5	31-119914-6210	Screw, Pan Hd., Slotted, 6-32 x 5/8 In.	
6	CL-210811-1	Fastener, Scotchmate	

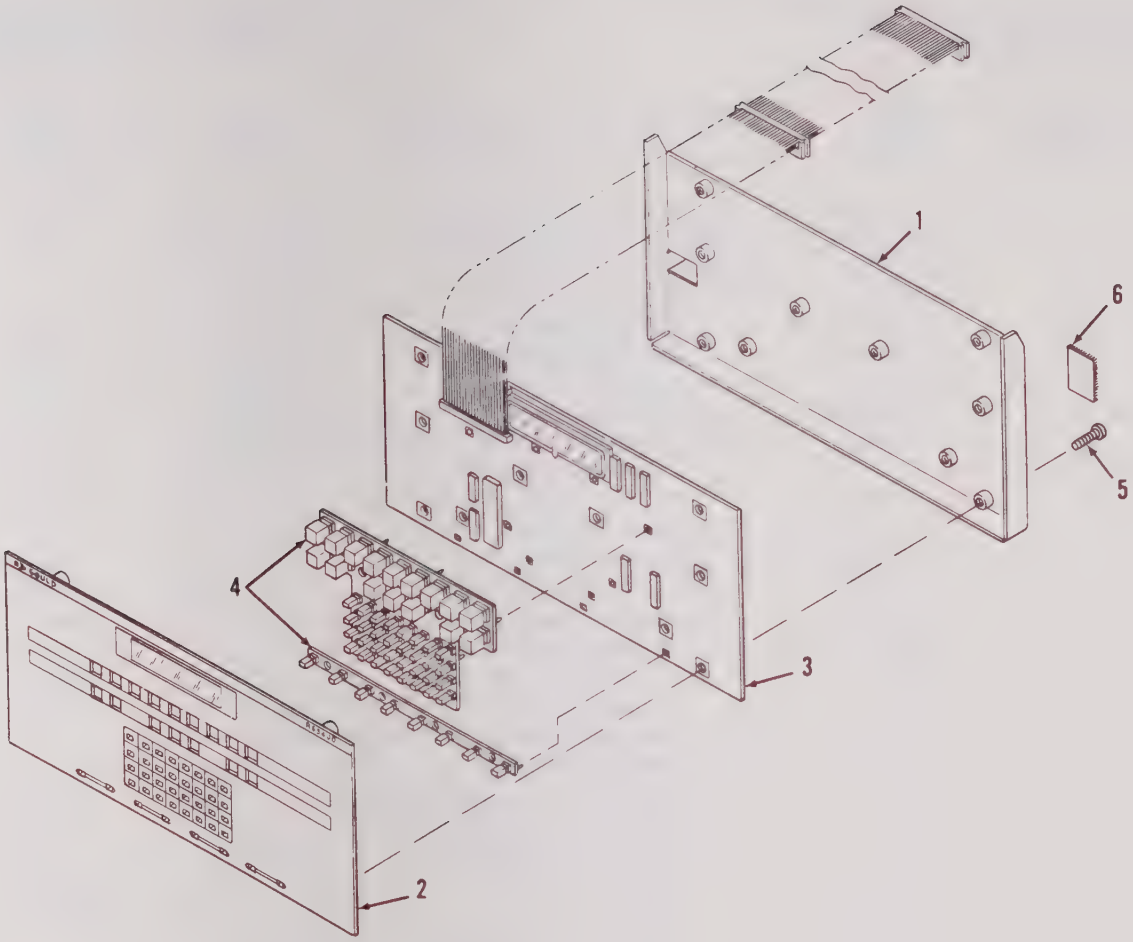


FIGURE 4-15 CONTROL PANEL ASSEMBLY

RS 3400 & RS 3200 THERMAL RECORDER
ENCLOSURE ASSEMBLY
FIGURE 4-16

ITEM NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6	USED ON
	CL-811646-1	Enclosure Assy. (RS 3400)	KLM
	CL-811643-1	Enclosure Assy. (RS 3200)	NP
1	CL-310769	Guide	
2	CL-610771-1	Guide, Engraved '1'	
3	CL-610771-3	Guide, Engraved	KLM
4	13-262716-2604	Screw, Self-Tapping, Pan Hd., 2-56 x 1/4 In.	
5	CL-210796	Support	
6	13-262716-8206	Screw, Self-Tapping, Pan Hd., 8-32 x 3/8 In.	
7	CL-811640	Board Assy., Mother (RS 3400) (See Fig. 4-43)	KLM
7	CL-811619	Board Assy., Mother (RS 3200) (See Fig. 4-42)	NP
8	31-119998-6204	Screw, Pan Hd., 6-32 x 1/4 In.	
	CL-710760-1	Panel Subassy., Rear (RS 3400)	KLM
	CL-710799-1	Panel Subassy., Rear (RS 3200)	NP
9	CL-410737-1	Panel, Rear (RS 3400)	KLM
9	CL-410798-1	Panel, Rear (RS 3200)	NP
10	269247-1	Spacer, Sleeve, Threaded	
11	13-262716-6204	Screw, Self-Tapping, Pan Hd., 6-32 x 1/4 In.	
12	270903-6	Clamp, Cable	
13	CL-712939	Cover Assy., Support (RS 3200)	KLM
13	CL-712964	Cover Assy., Support (RS 3400)	NP
14	13-262716-6204	Screw, Self-Tapping, Pan Hd., 6-32 x 1/4 In.	
15	CL-210805	Bracket (RS 3400)	KLM
15	CL-210797	Bracket (RS 3200)	NP
16	13-262716-6204	Screw, Self-Tapping, Pan Hd., 6-32 x 1/4 In.	
17	243898-62	Nut, Assembled Lockwasher, No. 6-32	
18	CL-810439	Board Assy., Medical Output (RS 3400) (See Fig. 4-38)	KLM
18	CL-810462	Board Assy., Medical Output (RS 3200) (See Fig. 4-40)	NP
19	31-119998-6204	Screw, Pan Hd., 6-32 x 1/4 In.	
20	CL-810438	Board Assy., Interconnect (RS 3400) (See Fig. 4-37)	KLM
20	CL-810461	Board Assy., Interconnect (RS 3200) (See Fig. 4-39)	NP
21	31-119998-6204	Screw, Pan Hd., 6-32 x 1/4 In.	
	CL-710772	Enclosure Subassy. (RS 3400)	KLM
	CL-710801	Enclosure Subassy. (RS 3200)	NP
22	269247-1	Spacer, Sleeve, Threaded	
23	269247-7	Spacer, Sleeve, Threaded	
24	CL-410735	Enclosure (RS 3400)	KLM
24	CL-410800	Enclosure (RS 3200)	NP
	CL-710761	Shelf Subassy., Lower (RS 3400)	KLM
	CL-710794	Shelf Subassy., Lower (RS 3200)	NP
25	CL-410738	Shelf, Lower (RS 3400)	KLM
25	CL-410795	Shelf, Lower (RS 3200)	NP
26	386058-6	Guide, Preamp-Bottom	

RS 3400 & RS 3200 THERMAL RECORDER ENCLOSURE ASSEMBLY (cont.) FIGURE 4-16

ITEM NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6	USED ON
27	13-262716-2604	Screw, Self-Tapping, Pan Hd., 2-56 x 1/4 In.	
28	13-262716-6204	Screw, Self-Tapping, Pan Hd., 6-32 x 1/4 In.	
	CL-711645-1	Shelf Subassy., Upper (RS 3400)	KLM
	CL-711642-1	Shelf Subassy., Upper (RS 3200)	NP
29	CL-711590	Fan Assy. (RS 3400)	KLM
29	CL-711591	Fan Assy. (RS 3200)	NP
30	270903-6	Clamp, Cable	
31	243898-40	Nut, Assembled Lockwasher, No. 4-40	
32	31-119920-4016	Screw, Machine, Flat Hd., 4-40 x 1 In.	
33	CL-610771-4	Guide, Engraved '4'	KLM
34	CL-610771-2	Guide, Engraved '2'	
35	386058-6	Guide, Preamp-Bottom	
36	13-262716-2604	Screw, Self-Tapping, Pan Hd., 2-56 x 1/4 In.	
37	CL-411644	Shelf, Upper (RS 3400)	KLM
37	CL-411641	Shelf, Upper (RS 3200)	NP
38	13-262716-6204	Screw, Self-Tapping, Pan Hd., 6-32 x 1/4 In.	
39	CL-212920	Bracket	
40	1-118195-305	Washer, Plain	
41	CL-212544-1	Guard, Wire Fan (RS 3200)	NP
41	CL-212544-2	Guard, Wire Fan (RS 3400)	KLM
42	31-119918-6208	Screw, Pan Hd., 6-32 x 1/2 In.	
43	112812-1	Plug, Banana	
44	269247-7	Spacer, Sleeve, Threaded	

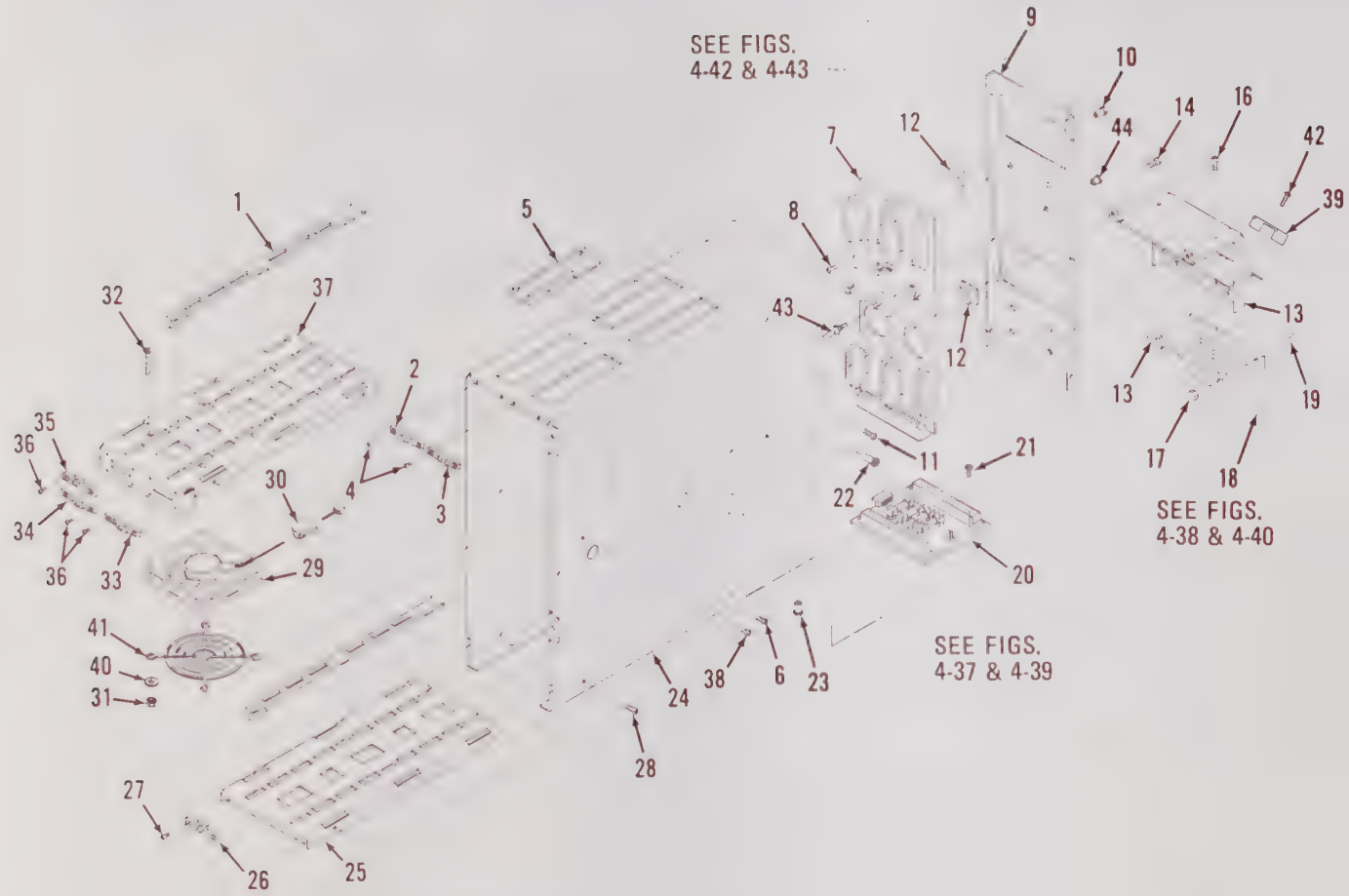


FIGURE 4-16 ENCLOSURE ASSEMBLY

RS 3400 & RS 3200 THERMAL RECORDER
PC BOARD INSTALLATION
FIGURE 4-17

ITEM NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6	USED ON
	Not Procurable	PC Board Installation (RS 3400)	KLM
	Not Procurable	PC Board Installation (RS 3200)	NP
1	CL-210649	Window, Voltage	
2	13-262715-8206	Screw, Self-Tapping, Flat Hd., 8-32 x 3/8 In.	
3	CL-712762	Panel Assy., Silkscreen (RS 3400)	KLM
3	CL-712763	Panel Assy., Silkscreen (RS 3200)	NP
4	13-262716-8204	Screw, Self-Tapping, Pan Hd., 8-32 x 3/8 In.	
5	CL-812905	Card Cage Assy. (RS 3400) (See Fig. 4-18)	KLM
5	CL-812907	Card Cage Assy. (RS 3200) (See Fig. 4-18)	NP
6	CL-812695	P.C. Board Assy., Power Supply, Dual Assy.	
7	CL-812811	P.C. Board Assy., Power Supply, 5 Volt (See Fig. 4-20)	
8	897658	P.C. Board Assy., Chart Drive (See Fig. 4-26)	
9	897637	P.C. Board Assy., Controller (See Fig. 4-23)	
10	CL-810312	P.C. Board Assy., Dummy Interface	
10	897728	P.C. Board Assy., RS232C Interface, Optional, (See Fig. 4-28) (RS232C Kit 11-6283-02)	
10	897727	P.C. Board Assy., IEEE-488 Interface, Optional, (See Fig. 4-27) (IEEE-488 Kit 11-6283-01)	
	897636	P.C. Board Assy., IRIG Time Decoder, Optional, (See Fig. 4-22) (IRIG Kit 11-6283-03)	
11	897406-1	P.C. Board Assy., Pen Servo Control (See Fig. 4-19)	
12	CL-812926	Panel Assy., Silkscreen, RS 3400	KLM
12	CL-812925	Panel Assy., Silkscreen, RS 3200	NP
13	31-262716-6204	Screw, Pan Hd., 6-32 x 1/4 In.	
14	13-262716-8204	Screw, Self-Tapping, Pan Hd., 8-32 x 1/4 In.	
15	31-119918-6204	Screw, Pan Hd., 6-32 x 1/4 In.	
16	1-216741-420	Lockwasher, Spring, No. 6	

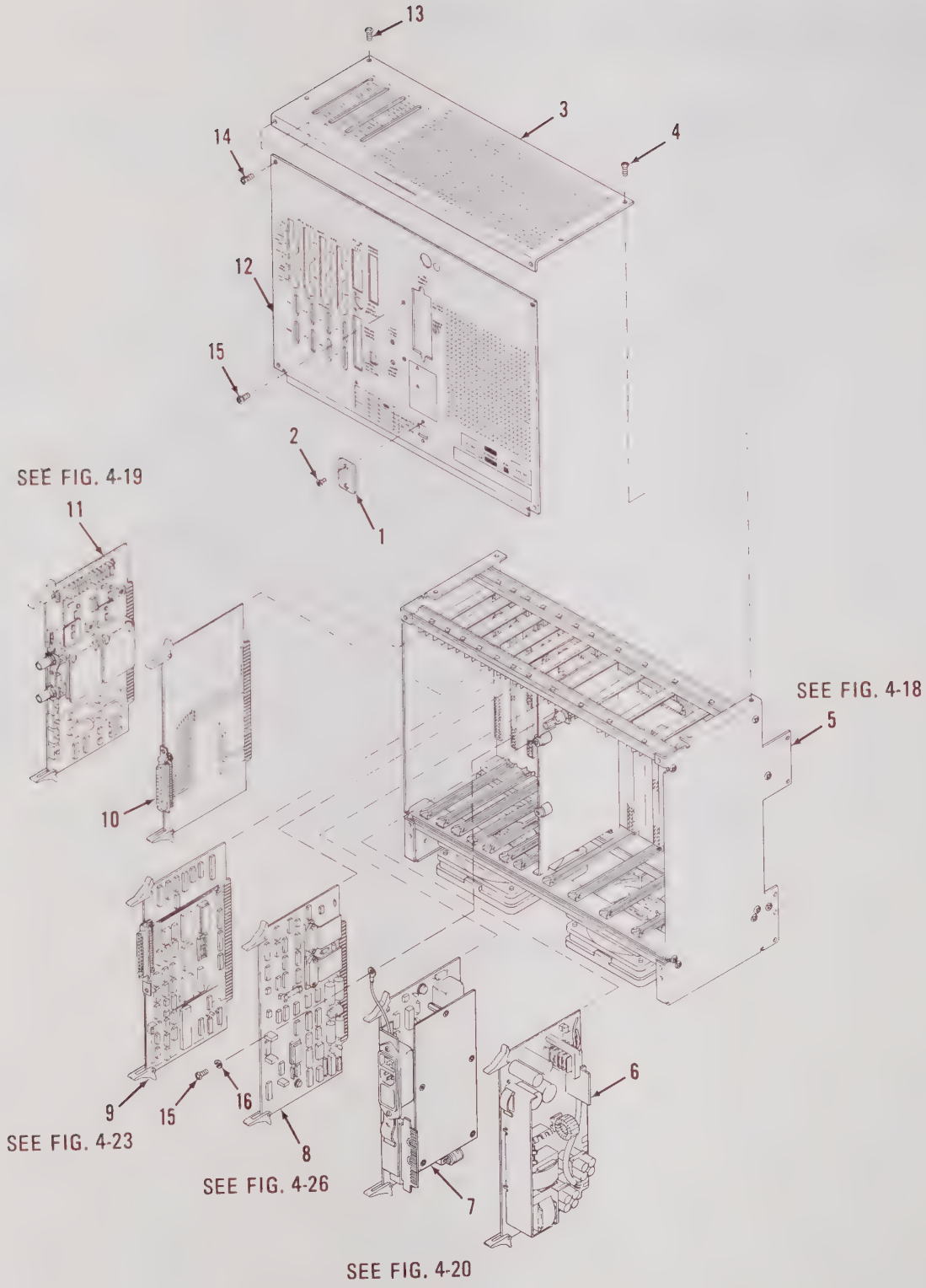


FIGURE 4-17 PC BOARD INSTALLATION

RS 3400 & RS 3200 THERMAL RECORDER
CARD CAGE ASSEMBLY
FIGURE 4-18

ITEM NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6	USED ON
	*CL-812905	Card Cage Assy. (RS 3400)	KLM
	*CL-812907	Card Cage Assy. (RS 3200)	NP
1	797904-2	Support, Mother Board (RS 3400)	KLM
1	797904-3	Support, Mother Board (RS 3200)	NP
2	13-262716-8206	Screw, Self-Tapping, Pan Hd., 8-32 x 3/8 In.	
3	CL-310958-5	Shield, Board (RS 3400)	KLM
3	CL-310958-6	Shield, Board (RS 3200)	NP
4	297915-1	Washer, Spacer, Nylon, 0.165 In. Thk., 0.165 In. ID x 1/2 In. OD	
5	897651	Board Assy., Mother (RS 3400) (See Fig. 4-25)	KLM
5	897650	Board Assy., Mother (RS 3200) (See Fig. 4-24)	NP
6	13-262716-8208	Screw, Self-Tapping, Pan Hd., 8-32 x 1/2 In.	
7	497847	Side Plate, Rear Left	
	*897918-2	Fan Assy. (RS 3400)	KLM
	*897918-3	Fan Assy. (RS 3200)	NP
8	797919-2	Support, Fan (RS 3400)	KLM
8	797919-3	Support, Fan (RS 3200)	NP
9	297719	Fan	
10	297715-1	Filter Assy.	
11	13-262716-0208	Screw, Self-Tapping, Pan Hd., 10-32 x 1/2 In.	
12	13-262716-8206	Screw, Self-Tapping, Pan Hd., 8-32 x 3/8 In.	
	*797905-2	Card Guide Assy. (RS 3400)	KLM
	*797905-3	Card Guide Assy. (RS 3200)	NP
13	897906-2	Support, Card Guide (RS 3400)	KLM
13	897906-3	Support, Card Guide (RS 3200)	NP
14	297800-2	Card Guide	
15	13-262716-8206	Screw, Self-Tapping, Pan Hd., 8-32 x 3/8 In.	
16	CL-312918	Mid Plate, Rear	
17	13-262716-8206	Screw, Self-Tapping, Pan Hd., 8-32 x 3/8 In.	
18	497846	Side Plate, Rear Right	
19	1-128693-3	Grommet, Caterpillar	
20	CL-612786	Lug Assy.	
21	CL-212919	Insert, Threaded	KLM
22	13-262716-6206	Screw, Self-Tapping, Pan Hd., 6-32 x 3/8 In.	

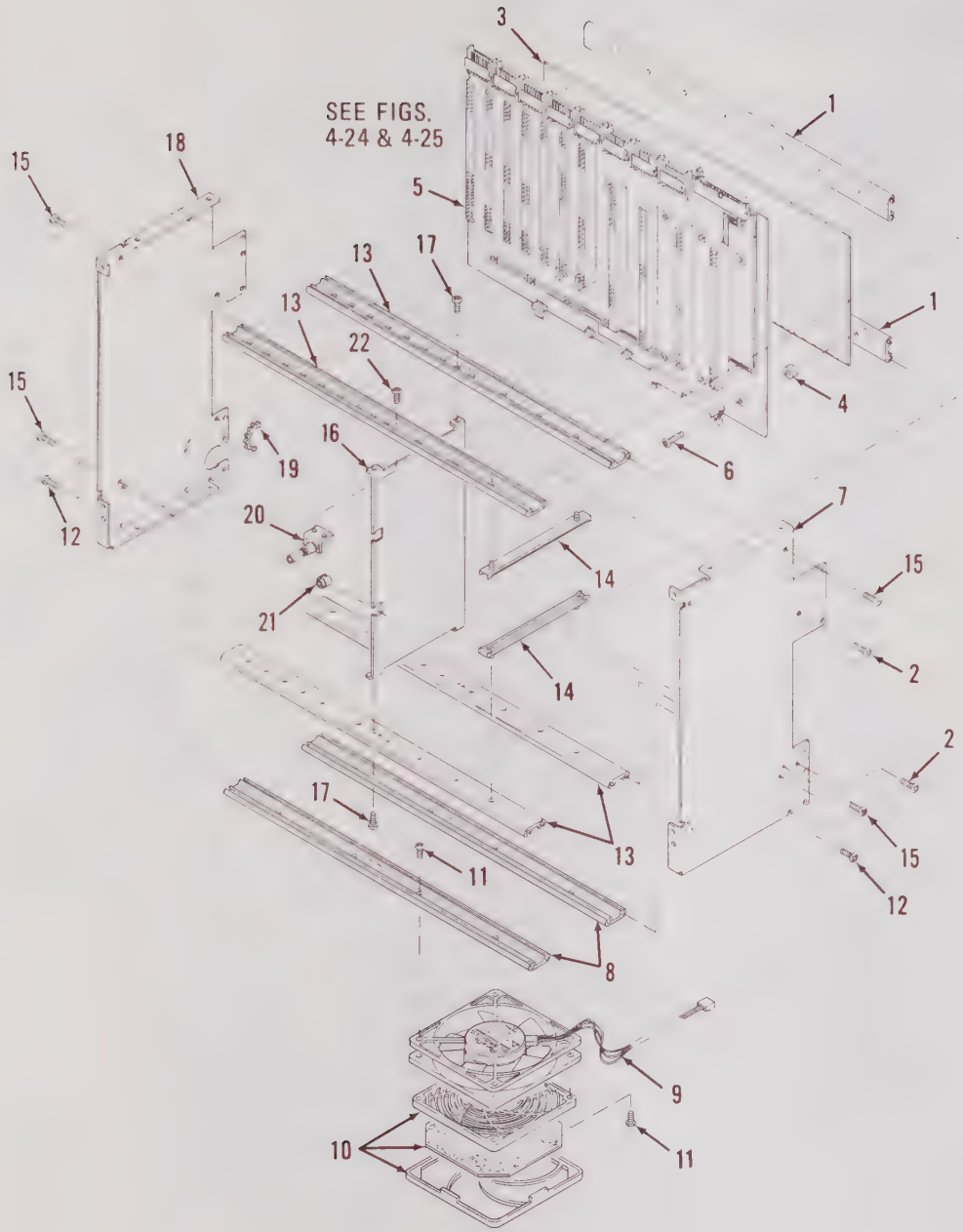


FIGURE 4-18 CARD CAGE ASSEMBLY

DESIGNATION	PART NUMBER	DESCRIPTION
XC1	287614-223	Capacitor, Monolithic, 50VDC, 0.022UF
XC2,XC3	263386-108	Capacitor, Electrolytic, 25WVDC, 1000UF
XC4-XC7	262585-106	Capacitor, Tantalum, 20WVDC, 10.0UF
C8,C9,XC10	288755-103	Capacitor, Monolithic, 50VDC, 0.01UF
XC11	262585-106	Capacitor, Tantalum, 20WVDC, 10.0UF
XC12	287614-222	Capacitor, Monolithic, 50VDC, 0.0022UF
XC13	287614-103	Capacitor, Monolithic, 50VDC, 0.01UF
XC14	287614-221	Capacitor, Monolithic, 50VDC, 0.00022UF
XCB1,XCB2	297966-3	Circuit Breaker, 1.5 Amp
XCR1,XCR2	270508	Diode, Low Cap., Fast Recovery, 1N4454
EJ1	290306-1	Ejector White (Not Shown)
EJ2	290306-2	Ejector Red (Not Shown)
XJ1	298040	BNC Connector, Receptacle (A-P)
	293848-4	Insulator, Sil-Pad, Diode Washer
	CL-612970	Bracket Assy.
XJ2	297967	Mini-Phone Jack, Break Before Make (Input)
XK1	288753	Relay, DIP, Reed, Dry
XL1	CL-210014-1	Inductor, 30 Ohms DC Res., 2.2MH
Q1-Q9	Not Used	
XQ10	281702-2	Transistor, NPN, 2N4401
XR1,XR2	293941-103	Potentiometer, Cermet, 10K
XR3	293941-503	Potentiometer, Cermet, 50K
XR4,XR5	293941-502	Potentiometer, Cermet, 5K
XR6	284878-103	Pot., Cermet, Single Turn Trimming 10K
XR7	CL-210097-1003	Resistor, Metal Film, 1/4W, 0.25%, 100K
XR8	CL-210097-2503	Resistor, Metal Film, 1/4W, 0.25%, 250K
XR9	CL-210097-5003	Resistor, Metal Film, 1/4W, 0.25%, 500K
XR10	CL-210097-1673	Resistor, Metal Film, 1/4W, 0.25%, 167K
XR11	CL-210097-1253	Resistor, Metal Film, 1/4W, 0.25%, 125K
XR12	CL-210099-2001	Resistor, Metal Film, 1/4W, 1%, 2K
XR13	CL-210099-5000	Resistor, Metal Film, 1/4W, 1%, 500 Ohms
XR14	CL-210099-1803	Resistor, Metal Film, 1/4W, 1%, 180K
R15-R26	Not Used	
XR27	CL-210099-2000	Resistor, Metal Film, 1/4W, 1%, 200 Ohms
XR28	CL-210099-1002	Resistor, Metal Film, 1/4W, 1%, 10K
XR29	CL-210099-2002	Resistor, Metal Film, 1/4W, 1%, 20K
XR30	CL-210099-5001	Resistor, Metal Film, 1/4W, 1%, 5K
XR31	CL-210099-2002	Resistor, Metal Film, 1/4W, 1%, 20K
R32	CL-210099-1001	Resistor, Metal Film, 1/4W, 1%, 1K

DESIGNATION	PART NUMBER	DESCRIPTION
R33	CL-210099-5001	Resistor, Metal Film, 1/4W, 1%, 5K
R34	CL-210099-1001	Resistor, Metal Film, 1/4W, 1%, 1K
R35	CL-210099-1201	Resistor, Metal Film, 1/4W, 1%, 1.2K
XR35	CL-210099-1003	Resistor, Metal Film, 1/4W, 1%, 100K
XR36	CL-210099-4703	Resistor, Metal Film, 1/4W, 1%, 470K
XR37	CL-210099-1001	Resistor, Metal Film, 1/4W, 1%, 1K
XR38	CL-210099-2002	Resistor, Metal Film, 1/4W, 1%, 20K
XR39	CL-210099-6202	Resistor, Metal Film, 1/4W, 1%, 62K
XR40	293941-103	Potentiometer, Cermet, 10K
XR41	5-241111-226	Resistor, Carbon, 1/4W, 5%, 22 Meg
XSW1	297965-6	DIP Switch, 6 Position
XTP	2-287495-6	Connector, In-Line 6 Position (Test Points)
XU1	297499-1	Control Amplifier Hybrid
XU2	297498-1	Oscillator Demodulator Hybrid
XU3	CL-212103	Pen Servo Output Module
XU4	CL-210009	I.C., CMOS, 4 Bit D/A Converter, 7542
XU5	296119-2	I.C., JFET Input, Dual Op Amp, LF412
XU6	291593	I.C., +12 Volt Regulator, MC7812 (A-P)
	31-119918-4005	Screw, Machine, Pan Hd., 4-40 x 5/16 In.
	243898-40	Nut, Assembled Lockwasher, #4-40
		----- * -----
XU7	291592	I.C., -12 Volt Regulator, MC7912 (A-P)
	31-119918-4005	Screw, Machine, Pan Hd., 4-40 x 5/16 In.
	243898-40	Nut, Assembled Lockwasher, #4-40
		----- * -----
U8	296674-139	I.C., H.S. CMOS, Dual Decoder, 74HC139
U9	296674-74	I.C., H.S. CMOS, Dual D Flip-Flop, 74HC74
U10	289388	I.C., +5 Volt Regulator, 78L05
XU11	297306	I.C., Op Amp, LT1012CN8

NOTE: Component designations beginning with an X are present in both A and B channels.

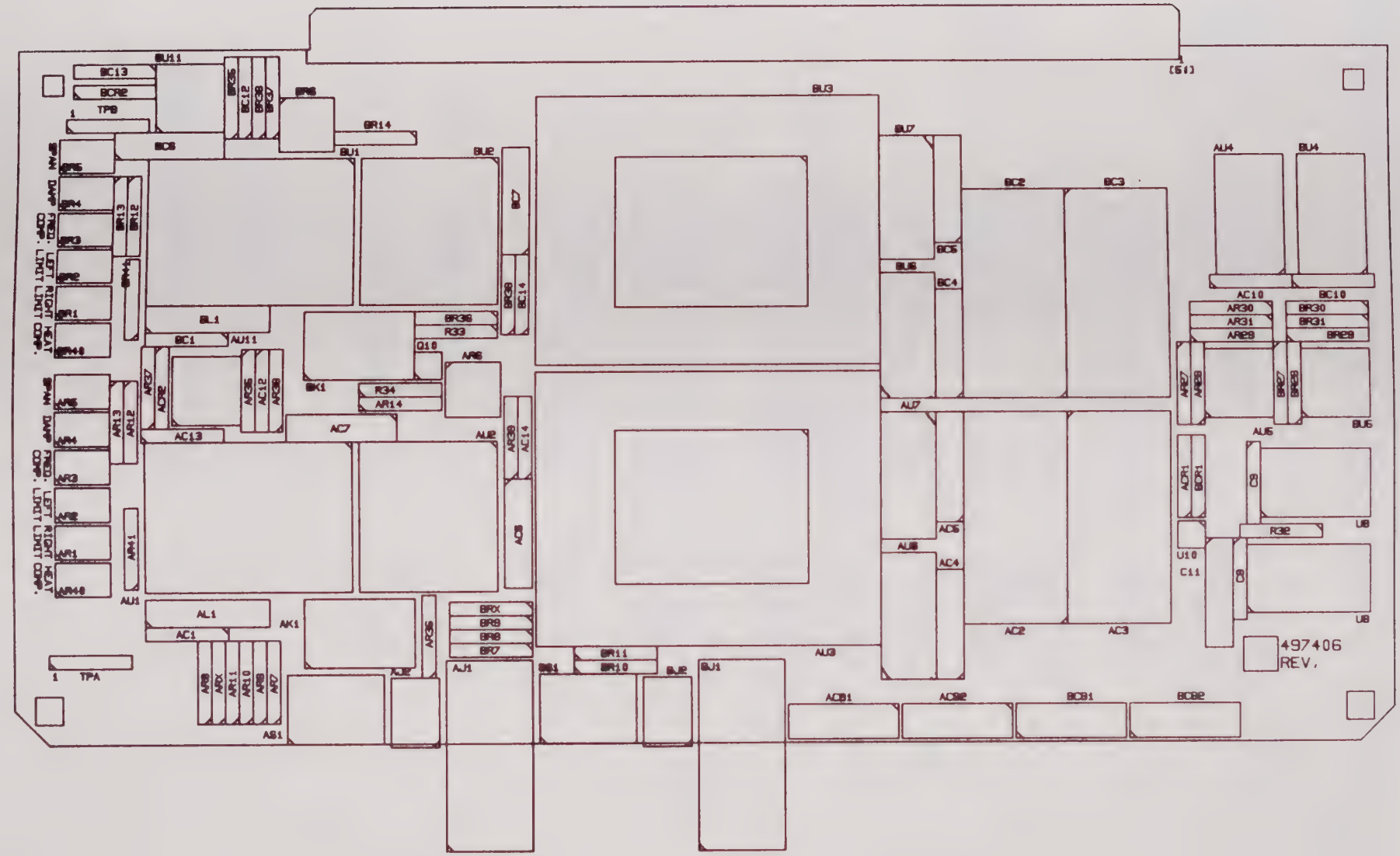


FIGURE 4-19 SERVO DRIVE BD.

DESIGNATION	PART NUMBER	DESCRIPTION
B1	CL-210118	Battery, AA Cell, 3.5V, Lithium Thionyl Chloride. NON-Rechargeable
		(A-P)
	232997-23	Tie Wrap, 3.5 In.
		----- * -----
BH1	CL-210206	Battery Holder
C1	Not Used	
C2	287614-223	Capacitor, Monolithic, 50VDC, +/- 10%, 0.022UF
C3-C9	Not Used	
C10-C12	283943-106	Capacitor, Tantalum, 20WVDC, +/-20%, 10UF
CR1-CR8	Not Used	
CR9	269256-7	Diode, 1A, 1N4007
EJ1	290306-1	Ejector White (Not Shown)
EJ2	290306-2	Ejector Red (Not Shown)
J1	1-293738-60	Connector, Dual Readout, Male, 60 Contacts
J2	CL-610789	Line Filter Output Cable Assy.
J3	CL-610788	Cable Assy., PSM1 AC Input
J4,J5	Not Used	
J6	CL-610790	Cable Assy., PSM1 Output
J7	CL-610791	Line Input Cable Assy.
L1	CL-210014-1	Inductor, 2.2 mH, +/-5%
LF	CL-210204	Power Line Filter, RFI, FN610-6/06
		(A-P)
	31-119918-6204	Screw, Pan Hd., 6-32 x 1/4 In.
	31-119998-62	Nut, Hex, #6-32
	1-216741-420	Lockwasher, Spring, #6
		----- * -----
P1	CL-810466	P.C. Board, Voltage/Select, (Not Shown)
P2-P4	281711-3	Connector, Male, 3 Contact
P5	Not Used	
P6	281711-6	Connector, Male, 6 Contact
PR1	CL-210203	Line Power Receptacle, On/Off Sw., Fuse Holder
		(A-P)
	CL-310215	Bracket
	13-262716-6210	Screw, Pan Hd., 6-32 x 5/8 In.
	113182-10	Fuse 10A, 3400, 115V Nominal Line Voltage
	2-297274-19	Fuse 6.3A, 3400, 230V Nominal Line Voltage
	113182-6	Fuse 6A, 3200, 115V Nominal Line Voltage
	2-297274-17	Fuse 4A, 3200, 230V Nominal Line Voltage
		----- * -----

DESIGNATION	PART NUMBER	DESCRIPTION
PSM1	CL-210774	Power Supply Module, +5 Volts (A-P)
	31-119918-6210	Screw, Pan Hd., 6-32 x 5/8 In.
	297915-3	Nylon Spacer, 1/4 In. High
	297915-4	Nylon Washer, 1/10 In. Thick
	31-119998-62	Nut, Hex, #6-32
	1-216741-420	Lockwasher, Spring, #6
		----- * -----
R1-R2	Not Used	
R3	CL-210099-4990	Resistor, Metal Film, 1/4W, 1%, 499Ω
R4-R10	Not Used	
R11	CL-210099-4991	Resistor, Metal Film, 1/4W, 1%, 4.99K
RN1,RN2	Not Used	
RN3	297492	Resistor Network, DIP, 4-10K Resistors
S1	294198-40	Switch, Thermal
TP1	Not Used	
TP2	265763-3	Contact, P.C. Pin, Male
U1	CL-210196	DC/DC Convertor, 5 VDC to 29VDC & 4.4 VAC
U2-U4	Not Used	
U5	296678	I.C., Voltage Reference, -10 volts, LH0070
U6	291062-3	I.C., Quad Operational Amplifier, TL084CN
U7	CL-610991	I.C., Programmed PAL, Divider By 50 Counter
U8	CL-213816	I.C., Quad FET Switch, LF13333N
UX1	285593-20	I.C. Socket, 20 Pin

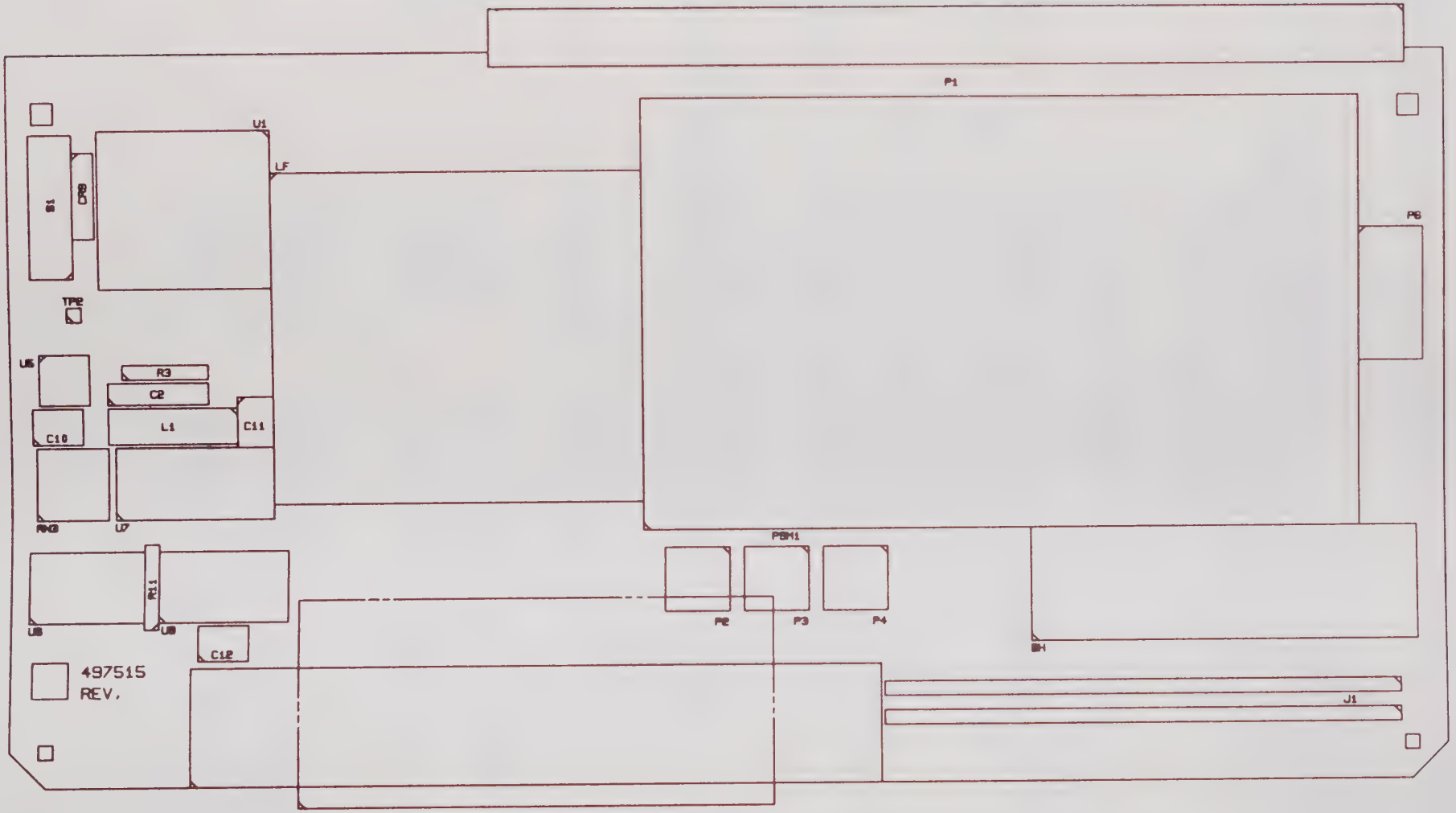


FIGURE 4-20 5 VOLT POWER SUPPLY BD.

RS 3200 & RS 3400
PC BOARD ASSY., CHART SUPPLY SENSOR 897635
FIGURE 4-21

DESIGNATION	PART NUMBER	DESCRIPTION
J1	CL-210228-10	Connector, P.C. Header, 10 Contact (A-P)
	293337	Key, Polarizing
		----- * -----
R1	CL-210099-51R0	Resistor, Metal Film, 1/4W, 1%, 51 Ohms
R2-R4	CL-210099-1002	Resistor, Metal Film, 1/4W, 1%, 10K
R5	CL-210099-82R0	Resistor, Metal Film, 1/4W, 1%, 82 Ohms
R6	CL-210099-1002	Resistor, Metal Film, 1/4W, 1%, 10K
R7	CL-210099-82R0	Resistor, Metal Film, 1/4W, 1%, 82 Ohms
U1-U3	298042	Photo Sensor, Reflective (A-P)
	243104-5	Washer, Nylon, #4
		----- * -----
U4	296674-125	I.C., H.S. CMOS, Quad Tri-State Buffer, 74HC125
U5,U6	298042	Photo Sensor, Reflective (A-P)
	243104-5	Washer, Nylon, #4
		----- * -----

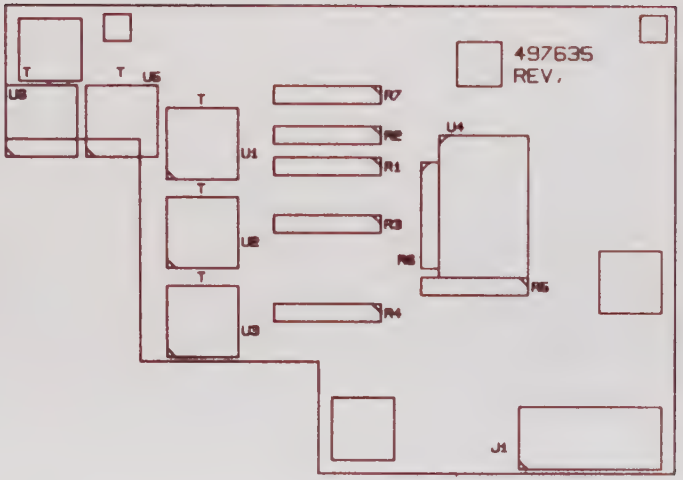


FIGURE 4-21 CHART SUPPLY SENSOR BD.

DESIGNATION	PART NUMBER	DESCRIPTION
C1	10-241145-105	Capacitor, Mylar, 100WVDC, 10%, 1UF
C2	10-269100-205	Capacitor, Mylar, 50WVDC, 10%, 2UF
C3	287614-102	Capacitor, Monolithic, 50VDC, 1000PF
C4-C18	288755-104	Capacitor, Monolithic, 50VDC, 0.1UF
C19-C-21	283943-106	Capacitor, Tantalum, 20WVDC, 20%, 10UF
C22,C23	283943-156	Capacitor, Tantalum, 20WVDC, 20%, 15UF
CR1-CR7	280440	Diode, 200ma, 1N4148
J1	294310-2	Connector, Rt. Angle, Male, 2 Pin
J2	292709-16	Connector, Receptacle 16 Pin
P1	296520-1	Shorting Plug
R1-R3	CL-210099-1001	Resistor, Metal Film, 1/4W, 1%, 1K
R4-47	CL-210099-2001	Resistor, Metal Film, 1/4W, 1%, 2K
R8	CL-210099-4001	Resistor, Metal Film, 1/4W, 1%, 4K
R9	CL-210099-5001	Resistor, Metal Film, 1/4W, 1%, 5K
R10-R12	CL-210099-1002	Resistor, Metal Film, 1/4W, 1%, 10K
R13	1-265969-20003	Resistor, Metal Film, 1/4W, 1%, 2 Meg
R14	5-241111-271	Resistor, Carbon, 1/4W, 5%, 270 Ohms
R15	CL-210099-5002	Resistor, Metal Film, 1/4W, 1%, 50K
R16,R17	Not Used	
R18	5-241111-242	Resistor, Carbon, 1/4W, 5%, 2.4K

DESIGNATION	PART NUMBER	DESCRIPTION
R19	5-241111-362	Resistor, Carbon, 1/4W, 5%, 3.6K
RN1	2-283274-102	Resistor Network, DIP, 13-1K Resistors
SW1	1-295641-1	DIP Switch, DPDT
U1	296674-00	I.C., H.S. CMOS, Quad NAND Gate, 74HC00
U2	296674-04	I.C., H.S. CMOS, Hex Inverter, 74HC04
U3	296674-14	I.C., H.S. CMOS, Hex Schmitt Inv., 74HC14
U4	296674-08	I.C., H.S. CMOS, Quad AND Gate, 74HC08
U5,U6	296674-27	I.C., H.S. CMOS, Triple 3 Input NOR Gate, 74HC27
U7	296674-32	I.C., H.S. CMOS, Quad OR Gate, 74HC32
U8-U10	296674-74	I.C., H.S. CMOS, Dual D Flip-Flop, 74HC74
U11	296674-125	I.C., H.S. CMOS, Quad Buffer, 74HC125
U12	296674-174	I.C., H.S. CMOS, Hex D Flip-Flop, 74HC174
U13-U15	296674-390	I.C., H.S. CMOS, Dual 4-Bit Decade Counter, 74HC390
U16	296674-393	I.C., H.S. CMOS, Dual 4-Bit Binary Counter, 74HC393
U17	296674-147	I.C., H.S. CMOS, 10 to 4 Line Priority Encoder, 74HC147
U18	296378	I.C., CMOS, Selectable 4 Decade Divider, RDD104
U19	291062-3	I.C., Quad Op Amp, TL084
U20	296120	I.C., Dual High Speed Comparator, LM319

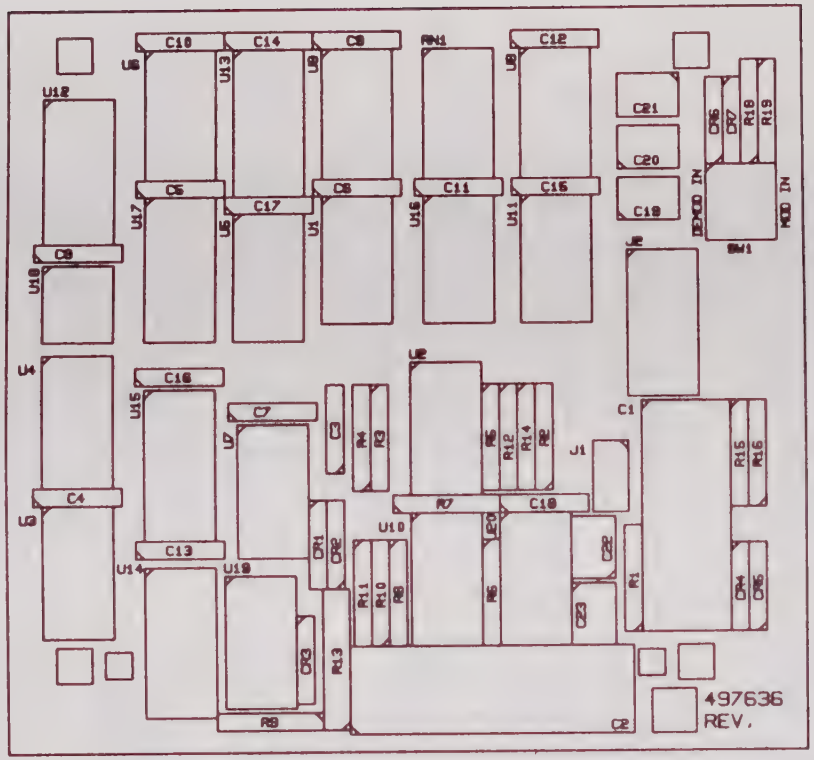


FIGURE 4-22 IRIG INTERFACE BD.

DESIGNATION	PART NUMBER	DESCRIPTION
C1	283943-476	Capacitor,Tantalum, 20WVDC, 47UF
C2-C4	240352-200	Capacitor, Ceramic, 1000WVDC, 20PF
C5-C45	288755-103	Capacitor, Monolithic, 50VDC, 0.01UF
CR1-CR4	280440	Diode, 200ma, 1N4148
EJ1	290306-1	Ejector White (Not Shown)
EJ2	290306-2	Ejector Red (Not Shown)
J1	Not Used	
J2	296508-37	Connector, Rt. Angle, Male, 37 Pin, D-Type (A-P)
	31-119918-4005	Screw, Pan Hd., 4-40 x 5/16 In.
	1-216741-411	Lockwasher, Spring, #4
	31-129647-40	Nut, Hex, #4-40
	CL-612972	Bracket Assembly
		----- * -----
Q1	Not Used	
Q2	286141	Transistor, NPN, 2N3904
R1	CL-210099-1002	Resistor, Metal Film, 1/4W, 1%, 10K
R2	Not Used	
R3-R5	CL-210099-1002	Resistor, Metal Film, 1/4W, 1%, 10K
R6	Not Used	
R7	CL-210099-1002	Resistor, Metal Film, 1/4W, 1%, 10K
R8	5-241111-472	Resistor, Carbon, 1/4W, 5%, 4.7K
R9	5-241111-201	Resistor, Carbon, 1/4W, 5%, 200 Ohms
R10,R11	5-241111-472	Resistor, Carbon, 1/4W, 5%, 4.7K
R12,R13	CL-210099-1002	Resistor, Metal Film, 1/4W, 1%, 10K
SW1	297965-4	DIP Switch, 4 Position
U1	296110	I.C., 8-Bit Microprocessor, 6809P
U2	Not Used	
U3	296674-244	I.C., H.S. CMOS, Octal Tri-State Buffer, 74HC244
U4	296674-245	I.C., H.S. CMOS, Octal Tri-State Transceiver, 74HC245
U5,U6	296674-138	I.C., H.S. CMOS, 3-8 Line Decoder, 74HC138
U7	296674-154	I.C., H.S. CMOS, 4-16 Line Decoder, 74HC154
U8	296674-74	I.C., H.S. CMOS, Dual D Flip-Flop, 74HC74
U9	CL-712557-04	I.C., Programmed EPROM, 32K X 8, AFP-Standard Configuration
U9	CL-712557-10	I.C., Programmed EPROM,3400, 1-100mm & 2-50mm Channels
U9	CL-712557-11	I.C., Programmed EPROM,3400, 2-100mm Channels
U9	CL-712557-12	I.C., Programmed EPROM,3200, 1-100mm Channels
U10	297990	I.C., NMOS, 512 x 8 Bit NOVRAM, X2004
U11	297978	I.C., Real Time Clock, 58274
U12	CL-210013	I.C., HMOS, Programmable Interval Timer, 8254

DESIGNATION	PART NUMBER	DESCRIPTION
U13	296674-160	I.C., H.S. CMOS, Synchronous Decade Counter, 74HC160
U14,15	296674-00	I.C., H.S. CMOS, Quad NAND Gate, 74HC00
U16	296674-02	I.C., H.S. CMOS, Quad NOR Gate, 74HC02
U17	296674-10	I.C., H.S. CMOS, Triple 3 Input NAND Gate, 74HC10
U18	Not Used	
U19	296674-273	I.C., H.S. CMOS, Octal D Flip-Flop, 74HC273
U20	289759	I.C., 7 Darlington Transistor Array, MC1413P
U21	296674-244	I.C., H.S. CMOS, Octal Tri-State Buffer, 74HC244
U22	296674-126	I.C., H.S. CMOS, Quad Tri-State Buffer, 74HC126
U23	296674-14	I.C., H.S. CMOS, Hex Schmitt Inv., 74HC14
U24	296674-74	I.C., H.S. CMOS, Dual D Flip-Flop, 74HC74
U25	CL-210009	I.C., CMOS, 4-Bit D/A Converter, 7542
U26	296674-21	I.C., H.S. CMOS, Dual 4 Input AND Gate, 74HC21
U27	296674-244	I.C., H.S. CMOS, Octal Tri-State Buffer, 74HC244
U28	296119-2	I.C., JFET Input, Dual Op Amp, LF412
U29	294786-1	I.C., Dual Voltage Comparator, LM393
U30	296674-244	I.C., H.S. CMOS, Octal Tri-State Buffer, 74HC244
U31	296674-14	I.C., H.S. CMOS, Hex Schmitt Inv., 74HC14
U32	296674-08	I.C., H.S. CMOS, Quad AND Gate, 74HC08
U33,U34	296378	I.C., CMOS, Selectable 4 Decade Divider, RDD104
U35	296674-107	I.C., H.S. CMOS, Dual J-K Flip-Flop, 74HC107
U36	296674-74	I.C., H.S. CMOS, Dual D Flip-Flop, 74HC74
U37	296674-4020	I.C., H.S. CMOS, 14-Bit Binary Counter, 74HC4020
U38	Not Used	
U39	296674-74	I.C., H.S. CMOS, Dual D Flip-Flop, 74HC74
U40	296363-1	I.C., CMOS, 2K x 8 Bit Static RAM, 2K X 8RAM
U41	296674-368	I.C., H.S. CMOS, Hex Inverter Tri-State Buffer, 74HC368
U42	296674-646	I.C., H.S. CMOS, Octal Bus Transceiver Register, 74HC646
U43	296674-138	I.C., H.S. CMOS, 3-8 Line Decoder, 74HC138
U44	296674-74	I.C., H.S. CMOS, Dual D Flip-Flop, 74HC74
X1	Not Used	
X2	288487-28	I.C. Socket, 28 Pin
XU1	1-283274-102	Resistor Network, DIP, 15-1K Resistors
XU2,XU3	1-283274-103	Resistor Network, DIP, 15-10K Resistors
XU4	1-283274-472	Resistor Network, DIP, 15-4.7K Resistors
Y1	296519-1	Crystal, 4MHZ
Y2	CL-210207	Crystal, 32KHZ

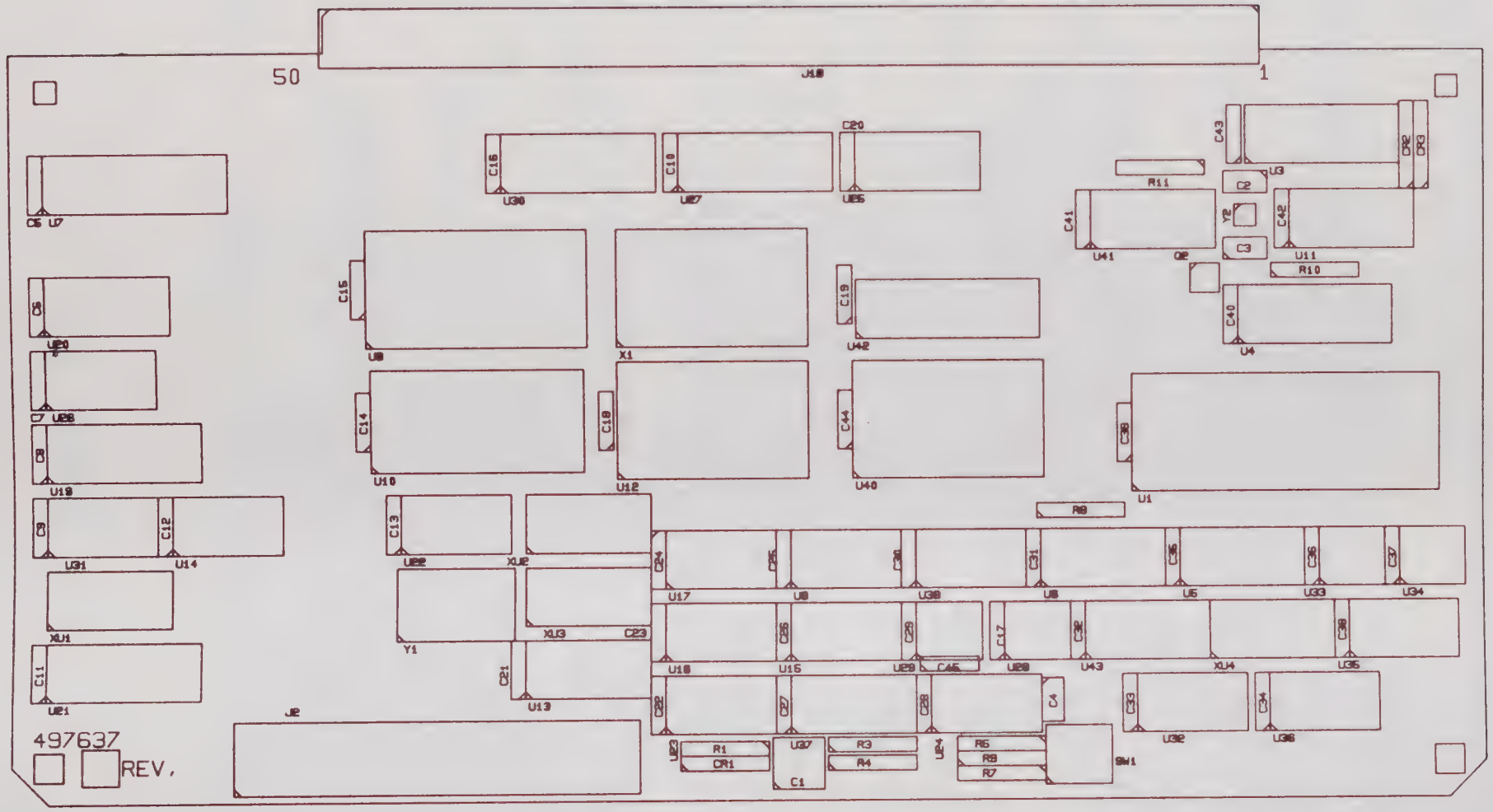


FIGURE 4-23 CONTROLLER BD.

DESIGNATION	PART NUMBER	DESCRIPTION
J1	1-292529-40	Connector, Rt. Angle, Male, 40 Pin (A-P)
	31-119918-2607	Screw, Pan Hd., 2-56 x 7/16
	1-216741-401	Lockwasher, Spring, #2
	243104-5	Washer, Nylon, #4
	31-119998-26	Nut, Hex, #2-56
	293337	Key, Polarization
		----- * -----
J2-J10	Not Used	
J11,J12	294063-8	Connector, Rt. Angle, Male, 8 Pin (A-P)
	CL-310567	Locater
		----- * -----
J13-J22	Not Used	
J23	297981-50	Connector, Edge Mt., Recept., 50 Contacts
J24-J30	Not Used	
J31	297981-50	Connector, Edge Mt., Recept., 50 Contacts
J32-J40	Not Used	
J41-J44	297981-50	Connector, Edge Mt., Recept., 50 Contacts
J45-J49	Not Used	
J50	281711-5	Connector, Male, 5 Pin
J51	1-292529-40	Connector, Rt. Angle, Male, 40 Pin (A-P)
	31-119918-2607	Screw, Pan Hd., 2-56 x 7/16
	1-216741-401	Lockwasher, Spring, #2
	243104-5	Washer, Nylon, #4
	31-119998-26	Nut, Hex, #2-56
	293337	Key, Polarization
		----- * -----
J52,J53	Not Used	
J54	294310-4	Connector, Rt. Angle, Male 4 Pin
J55,J56	Not Used	
J57	1-292529-40	Connector, Rt. Angle, Male, 40 Pin (A-P)
	31-119918-2607	Screw, Pan Hd., 2-56 x 7/16
	1-216741-401	Lockwasher, Spring, #2
	243104-5	Washer, Nylon, #4
	31-119998-26	Nut, Hex, #2-56
	293337	Key, Polarization
		----- * -----
J58,J59	Not Used	
J60	294063-4	Connector, Rt. Angle, 4 Pin
R1	5-115559-100	Resistor, Carbon, 2W, 5%, 10 Ohms

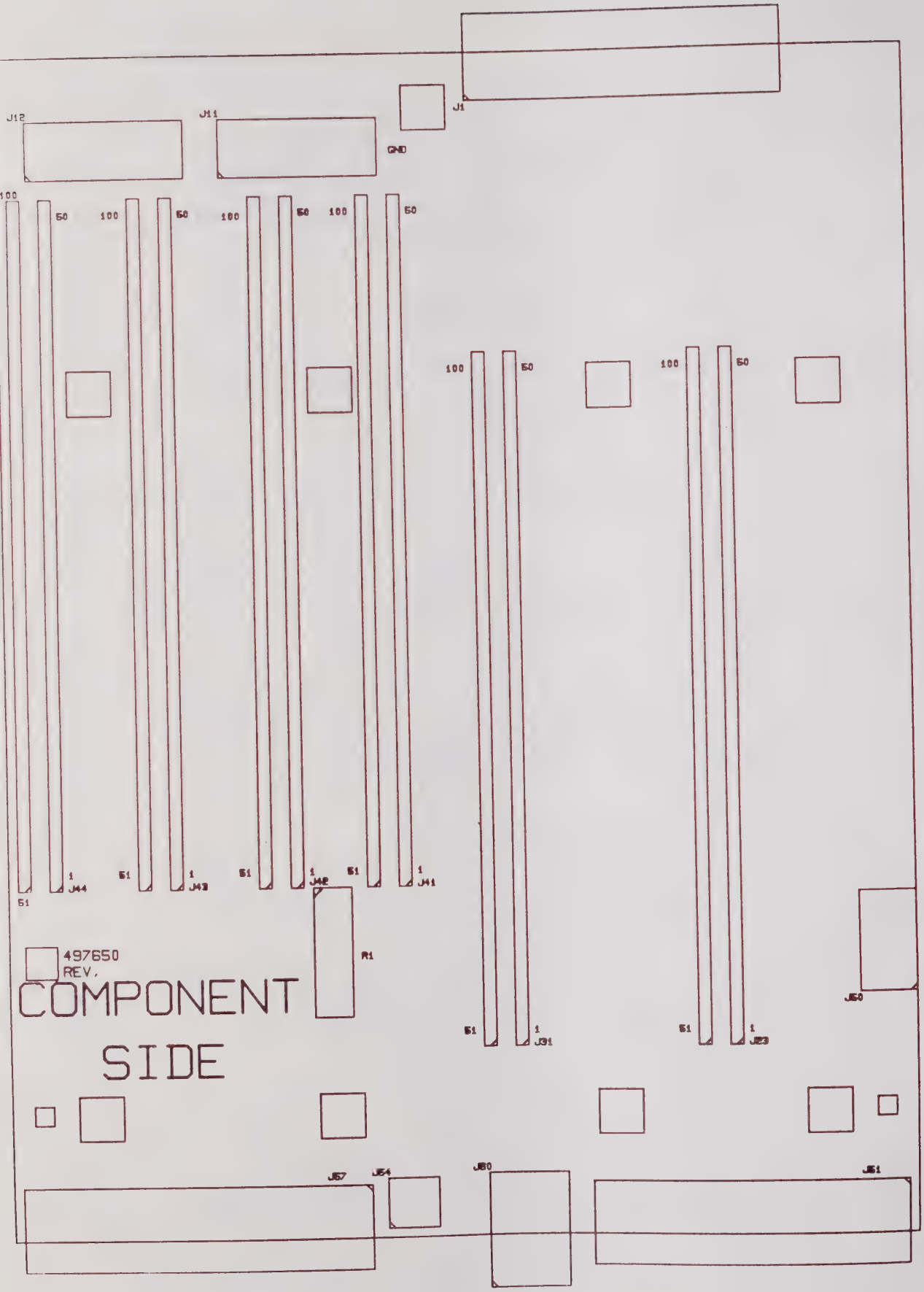


FIGURE 4-24 RS 3200 MOTHER BD.

DESIGNATION	PART NUMBER	DESCRIPTION
J1	1-292529-40	Connector, Rt. Angle, Male, 40 Pin (A-P)
	31-119918-2607	Screw, Pan Hd., 2-56 x 7/16
	1-216741-401	Lockwasher, Spring, #2
	243104-5	Washer, Nylon, #4
	31-119998-26	Nut, Hex, #2-56
	293337	Key, Polarization
		----- * -----
J2-J10	Not Used	
J11-J14	294063-8	Connector, Rt. Angle, 8 Pin (A-P)
	CL-310567	Locater
		----- * -----
J15-J21	Not Used	
J22,J23	297981-50	Connector, Edge Mt., Recept., 50 Contacts
J24-J30	Not Used	
J31	297981-50	Connector, Edge Mt., Recept., 50 Contacts
J32-J40	Not Used	
J41-J45	297981-50	Connector, Edge Mt., Recept., 50 Contacts
J46-J49	Not Used	
J50	281711-5	Connector, Male, 5 Pin
J51	Not Used	
J52	1-292529-40	Connector, Rt. Angle, Male, 40 Pin (A-P)
	31-119918-2607	Screw, Pan Hd., 2-56 x 7/16
	1-216741-401	Lockwasher, Spring, #2
	243104-5	Washer, Nylon, #4
	31-119998-26	Nut, Hex, #2-56
	293337	Key, Polarization
		----- * -----
J53	Not Used	
J54,J55	294310-4	Connector, Rt. Angle, Male, 4 Pin
J56	Not Used	
J57	1-292529-40	Connector, Rt. Angle, Male, 40 Pin (A-P)
	31-119918-2607	Screw, Pan Hd., 2-56 x 7/16
	1-216741-401	Lockwasher, Spring, #2
	243104-5	Washer, Nylon, #4
	31-119998-26	Nut, Hex, #2-56
	293337	Key, Polarization
		----- * -----
J58,J59	Not Used	
J60	294063-4	Connector, Rt. Angle, 4 Pin
R1,R2	5-115559-100	Resistor, Carbon, 2W, 5%, 10 Ohms

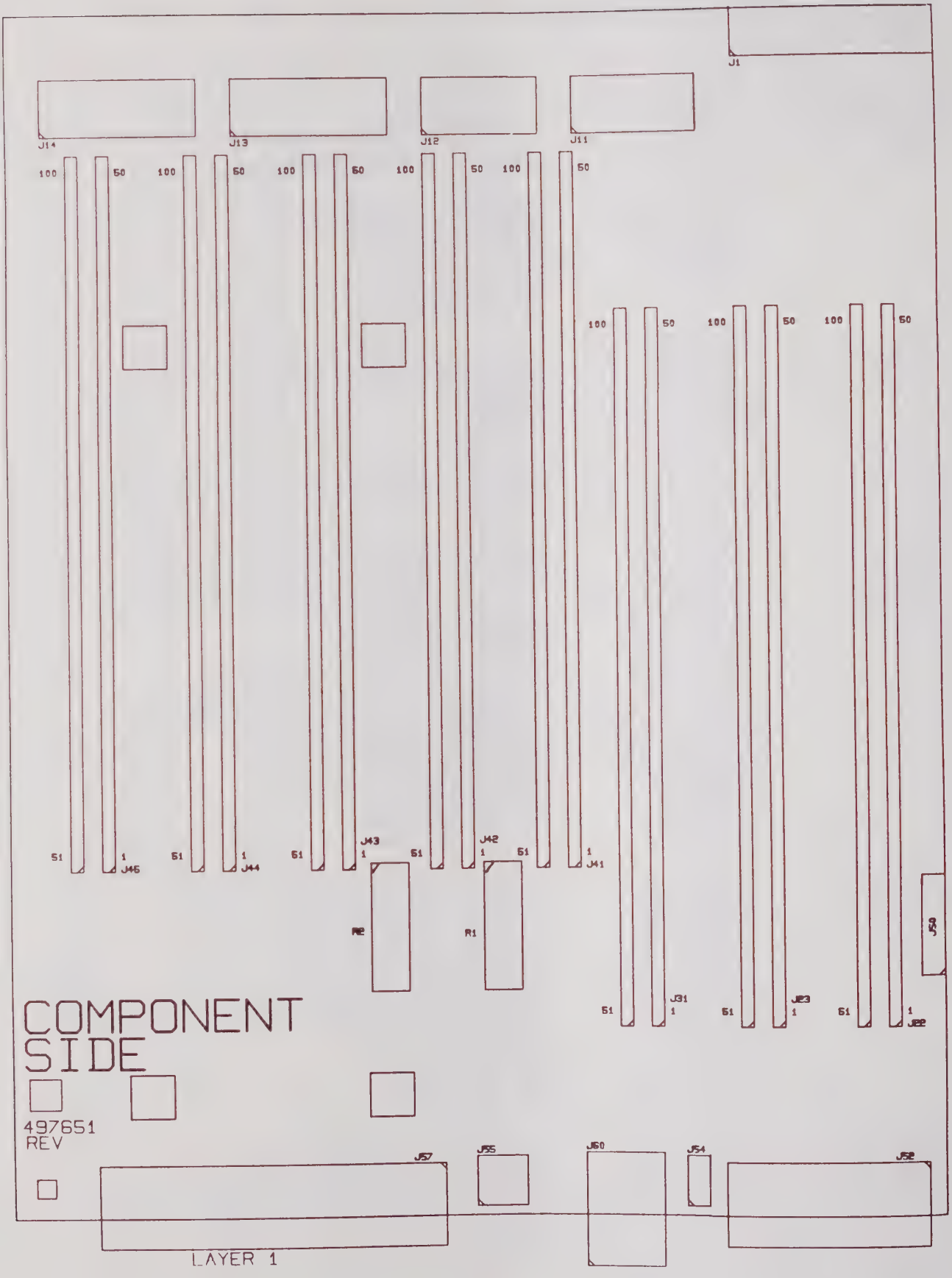


FIGURE 4-25 RS 3400 MOTHER BD.

RS 3200 & RS 3400
PC BOARD ASSY., CHART DRIVE 897658
FIGURE 4-26

DESIGNATION	PART NUMBER	DESCRIPTION
C1	10-288757-220	Capacitor, Mono-Glass, 50VDC, 10%, 22PF
C2,C3	288755-104	Capacitor, Monolithic, 50VDC, 0.1UF
C4,C5	294678-391	Capacitor, Polystyrene, 50WVDC, 2.5%, 390PF
C6	288755-104	Capacitor, Monolithic, 50VDC, 0.1UF
C7,C8	287614-102	Capacitor, Monolithic, 50VDC, 100PF
C9-C11	Not Used	
C12,C13	283943-106	Capacitor, Tantalum, 20WVDC, 20%, 10UF
C14,C15	263386-108	Cap., Electrolytic, 25WVDC, 20%, 1000UF
C16-C19	Not Used	
C20-C25	287614-104	Capacitor, Monolithic, 50VDC, 0.1UF
C26-C36	288755-104	Capacitor, Monolithic, 50VDC, 0.1UF
C37,C38	287614-104	Capacitor, Monolithic, 50VDC, 0.1UF
CR1-CR5	280440	Diode, 200ma, 1N4148
CR6-CR13	CL-210393-1	Diode, 4A, MUR405
EJ1	290306-1	Ejector White (Not Shown)
EJ2	290306-2	Ejector Red (Not Shown)
F1	116198-14	Fuse 5 Amp
FC1,FC2	285577	Fuse Clip
L1,L2	CL-210391-2	Inductor, 5A, 10UH
L3	CL-210391-1	Inductor, 1A, 100UH
R1,R2	CL-210099-4991	Resistor, Metal Film, 1/4W, 1%, 4.99K
R3	CL-210099-7501	Resistor, Metal Film, 1/4W, 1%, 7.5K
R4	CL-210099-2001	Resistor, Metal Film, 1/4W, 1%, 2K
R5	CL-210099-3001	Resistor, Metal Film, 1/4W, 1%, 3K
R6,R7	CL-210099-1003	Resistor, Metal Film, 1/4W, 1%, 100K
R8	Not Used	
R9	CL-210099-1001	Resistor, Metal Film, 1/4W, 1%, 1K
R10	Not Used	
R11	CL-210099-2201	Resistor, Metal Film, 1/4W, 1%, 2.2K
R12	CL-210099-3301	Resistor, Metal Film, 1/4W, 1%, 3.3K
R13	CL-210099-1002	Resistor, Metal Film, 1/4W, 1%, 10K
R14-R16	Not Used	
R17	CL-210099-4701	Resistor, Metal Film, 1/4W, 1%, 4.7K
R18	CL-210099-1002	Resistor, Metal Film, 1/4W, 1%, 10K
R19-R21	Not Used	
R22	CL-210099-2201	Resistor, Metal Film, 1/4W, 1%, 2.2K
R23	CL-210099-3301	Resistor, Metal Film, 1/4W, 1%, 3.3K
R24	CL-210099-1002	Resistor, Metal Film, 1/4W, 1%, 10K
R25	CL-210099-1004	Resistor, Metal Film, 1/4W, 1%, 1 Meg
R26	CL-210099-1001	Resistor, Metal Film, 1/4W, 1%, 1K

DESIGNATION	PART NUMBER	DESCRIPTION
R27	293941-203	Potentiometer, Cermet, 20K
R28	CL-210099-4701	Resistor, Metal Film, 1/4W, 1%, 4.7K
R29	Not Used	
R30	CL-210099-4701	Resistor, Metal Film, 1/4W, 1%, 4.7K
R31	CL-210099-1002	Resistor, Metal Film, 1/4W, 1%, 10K
R32-R34	Not Used	
R35	CL-210099-4701	Resistor, Metal Film, 1/4W, 1%, 4.7K
36-R42	Not Used	
R43	293941-502	Potentiometer, Cermet, 5K
R44	CL-210099-6001	Resistor, Metal Film, 1/4W, 1%, 6K
R45-R48	Not Used	
R49,R50	1-130340-0R1	Resistor, 3W, 0.1 Ohm
R51-R54	Not Used	
R55	CL-210099-2003	Resistor, Metal Film, 1/4W, 1%, 200K
R56,R57	CL-210099-1002	Resistor, Metal Film, 1/4W, 1%, 10K
R58	CL-210099-2003	Resistor, Metal Film, 1/4W, 1%,200K
R59-R61	CL-210099-1002	Resistor, Metal Film, 1/4W, 1%, 10K
RN1,RN2	296511-103	Resistor Network, SIP, 9-10K Resistors
RN3,RN4	3-283274-101	Resistor Network, DIP, 8-100 Ohm Resistors
RN5	3-283274-472	Reisitor Network, DIP, 8-4.7K Resistors
RN6-RN8	3-283274-103	Reisitor Network, DIP, 8-10K Resistors
RN9,RN10	297492	Reisitor Network, DIP, 4-10K Resistors
TP1-TP6	265763-3	Contact
U1-U4	296674-541	I.C., H.S. CMOS, Oct. Dr./Buffer, 74HC541
U5	296674-32	I.C., H.S. CMOS, Quad OR Gate, 74HC32
U6	296674-139	I.C., H.S. CMOS, Dual Decoder, 74HC139
U7	296674-04	I.C., H.S. CMOS, Hex Inverter, 74HC04
U8	296674-125	I.C., H.S. CMOS, Quad Buffer, 74HC125
U9	296674-74	I.C., H.S. CMOS, Dual D Flip-Flop, 74HC74
U10	CL-210009	I.C., D/A Converter, 4 Bit, AD7542
U11	291952	I.C., Operational Amplifier, OP-07BI
U12	296275-1	I.C., JFET Input, Op Amp, LF411ACN
U13	CL-210013	I.C., HMOS, Programmable Interval Timer, 8254
U14	296674-393	I.C., H.S. CMOS, Dl 4-Bit Bin Ctr, 74HC393
U15	CL-611024	I.C., Programmed PAL, Motor Phase Cont.
U16	296678	I.C., 10 Volt Precision Reference, LH0070
U17	296674-74	I.C., H.S. CMOS, Dual D Flip-Flop, 74HC74
U18	291062-3	I.C., Quad Op Amp, TL084CN
U19,U20	CL-611025	I.C., Programmed ROM, Sine Function
U21,U22	293085	I.C., D/A Converter, 8-Bit, AD7524

DESIGNATION	PART NUMBER	DESCRIPTION
U23	Not Used	
U24	296674-393	I.C., H.S. CMOS, (2) 4-Bit Bin Ctr, 74HC393
U25	Not Used	
U26	296674-74	I.C., H.S. CMOS, Dual D Flip-Flop, 74HC74
U27	296674-86	I.C., H.S. CMOS, Quad XOR Gate, 74HC86
U28	290169-26	I.C., Low Power Schottky, Quad NAND, 74LS26
U29,U30	296674-273	I.C., H.S. CMOS, Octal D Flip-Flop, 74HC273
U31,U32	Not Used	
U33	286146	I.C., Quad Voltage Comparator, LM339N
U34	Not Used	
U35	291062-3	I.C., Quad Op Amp, TL084CN
U36	Not Used	
U37	293086	I.C., Voltage to Freq. Converter, LM331AN
U38	291062-3	I.C., Quad Op Amp, TL084CN
U39,U40	293093	Transistor, DIP, Quad NPN, MPQ3904
U41	Not Used	
U42,U44	293094	Transistor, DIP, Quad PNP, MPQ3906
U45,U46	CL-210381	I.C., Hex FET Power Hybrid, IRFT-003 (A-P)
	CL-210726	Heat Sink
	293848-10	Insulator, Sil-Pad, 1RFT003
	31-119918-2606	Screw, Pan Hd., 2-56 x 3/8 In.
	1-120052-201	Lockwasher, Internal Tooth, #2
	31-119998-26	Nut, Hex, #2-56
		----- * -----
U47	290169-26	I.C., Low Power Schottky, Quad NAND, 74LS26
U48	285317	I.C., +5 Volt Regulator, 7805 (A-P)
	293324-1	Heat Sink
	293848-3	Insulator, Sil-Pad, Flat Pack
	31-119918-4006	Screw, Pan Hd., 4-40 x 3/8 In.
	1-216741-410	Lockwasher, Spring, #4
	31-119998-40	Nut, Hex, #4-40
		----- * -----
XU1	292709-24	I.C. Socket, 24 Pin
XU2,XU3	292709-16	I.C. Socket, 16 Pin
XU4	292709-20	I.C. Socket, 20 Pin

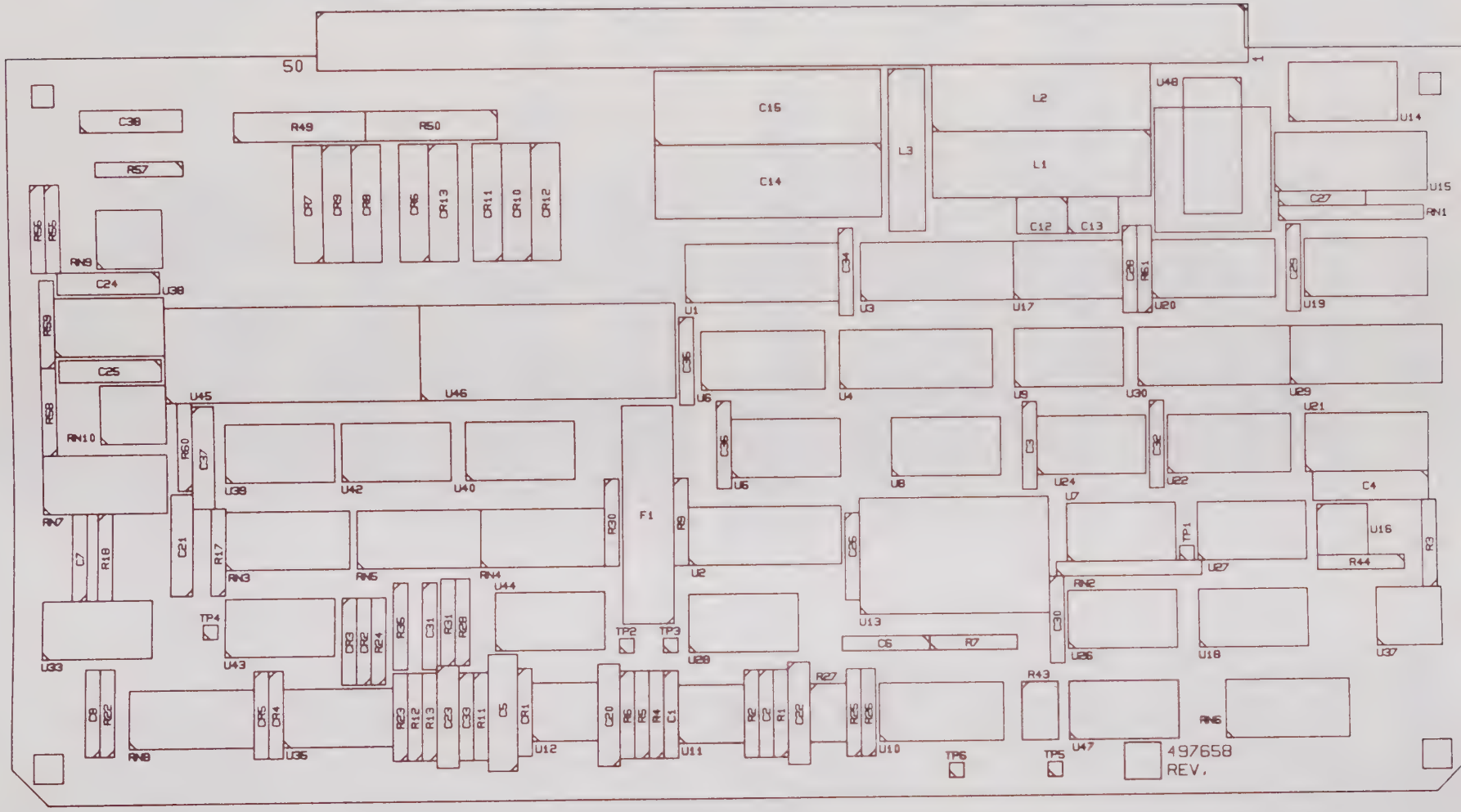


FIGURE 4-26 CHART DRIVE BD.

DESIGNATION	PART NUMBER	DESCRIPTION
C1-C2	Not Used	
C3-C5	288755-104	Capacitor, Monolithic, 50VDC, 0.1UF
C6	Not Used	
C7-C9	288755-104	Capacitor, Monolithic, 50VDC, 0.1UF
C10	Not Used	
C11-C16	288755-104	Capacitor, Monolithic, 50VDC, 0.1UF
C17	Not Used	
C18	288755-104	Capacitor, Monolithic, 50VDC, 0.1UF
C19	Not Used	
C20,C212	88755-104	Capacitor, Monolithic, 50VDC, 0.1UF
C22-C25	Not Used	
C26-C28	288755-104	Capacitor, Monolithic, 50VDC, 0.1UF
C29-C39	Not Used	
C40	283943-106	Capacitor, Tantalum, 20WVDC, 20%, 10UF
EJ1	290306-1	Ejector White (Not Shown)
EJ2	290306-2	Ejector Red (Not Shown)
J1	CL-210286	Connector, IEEE Receptacle (A-P)
	31-119918-4005	Screw, Pan Hd., 4-40 x 5/16 In.
		----- * -----
J2	296509-37	Connector, Rt. Angle Female, 37 Pin, D-Type (A-P)
	31-119918-4005	Screw, Pan Hd., 4-40 x 5/16 In.
	1-216741-411	Lockwasher, Spring, #4
	31-129647-40	Nut, Hex, #4-40
	CL-612972	Bracket Assembly
		----- * -----
J3	298040	BNC Connector, Receptacle
RP1	3-283274-102	Resistor Network, DIP, 8-1K Resistors
RP2	4-283274-103	Resistor Network, DIP, 7-10K Resistors
RP3	2-283274-102	Resistor Network, DIP, 13-1K Resistors
SW1	286142-8	DIP Switch, 8 Position

DESIGNATION	PART NUMBER	DESCRIPTION
SW2	Not Used	
SW3	286142-3	DIP Switch, 3 Position
U1	296110	I.C., 8-Bit Microprocessor, 6809P
U2	292139	I.C., Progr. Peripheral Interface, 8255A
U3	Not Used	
U4	296674-244	I.C., H.S. CMOS, Octal Tri-State Buffer, 74HC244
U5	Not Used	
U6	296363-1	I.C., CMOS, 2K x 8 Static RAM, 6516
U7	CL-611652-03	I.C., Programmed EPROM, 4K x 8
U8	296674-154	I.C., H.S. CMOS, 4-16 Line Decoder, 74HC154
U9	296674-139	I.C., H.S. CMOS, Dual 2-4 Decoders, 74HC139
U10	296674-244	I.C., H.S. CMOS, Octal Tri-State Buffer, 74HC244
U11	Not Used	
U12	296109	I.C., GPIB Talker/Listener, 8291A
U13-U16	296111	I.C., Quad Bus Transceiver, 3448
U17	Not Used	
U18	296674-126	I.C., H.S. CMOS, Quad Buffer, 74HC126
U19	Not Used	
U20	296674-11	I.C., H.S. CMOS, Triple 3 Input AND Gate, 74HC11
U21	296674-00	I.C., H.S. CMOS, Quad NAND Gate, 74HC00
U22	290169-04	I.C., Low Power Schottky, Hex Inverter, 74LS04
U23	296674-04	I.C., H.S. CMOS, Hex Inverter, 74HC04
X1-X14	Not Used	
X15	288487-24	I.C. Socket, 24 Pin
X16-X23	Not Used	
X24	288487-24	I.C. Socket, 24 Pin
X25	285593-16	I.C. Socket, 16 Pin

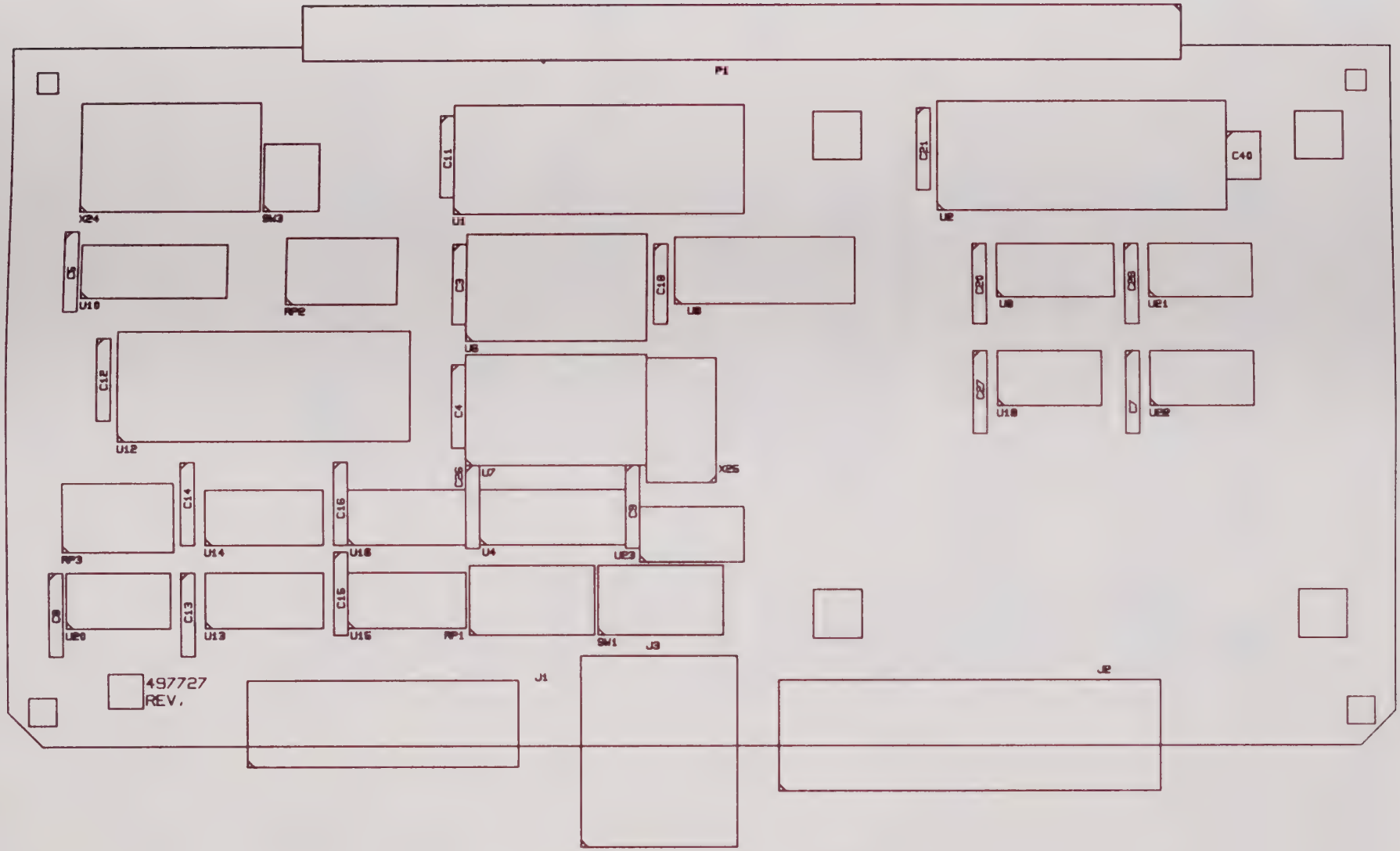


FIGURE 4-27 IEEE-488 INTERFACE BD.

RS 3200 & RS 3400
PC BOARD ASSY., RS-232 INTERFACE 897728
FIGURE 4-28

DESIGNATION	PART NUMBER	DESCRIPTION
C1	Not Used	
C2-C5	288755-104	Capacitor, Monolithic, 50VDC, 0.1UF
C6	Not Used	
C7-C11	288755-104	Capacitor, Monolithic, 50VDC, 0.1UF
C12-C17	Not Used	
C18	288755-104	Capacitor, Monolithic, 50VDC, 0.1UF
C19	Not Used	
C20-C22	288755-104	Capacitor, Monolithic, 50VDC, 0.1UF
C23-C25	Not Used	
C26-C28	288755-104	Capacitor, Monolithic, 50VDC, 0.1UF
C29-C39	Not Used	
C40	283943-106	Capacitor, Tantalum, 20WVDC, 20%, 10UF
C41-C49	Not Used	
C50	240352-300	Capacitor, Ceramic, 1000WVDC, 30PF
EJ1	290306-1	Ejector White (Not Shown)
EJ2	290306-2	Ejector Red (Not Shown)
J1	296509-25	Connector, Rt. Angle Female, 25 Pin, D-Type (A-P)
	31-119918-4005	Screw, Pan Hd., 4-40 x 5/16 In.
	1-216741-411	Lockwasher, Spring, #4
	31-129647-40	Nut, Hex, #4-40
		----- * -----
J2	296509-37	Connector, Rt. Angle Female, 37 Pin, D-Type (A-P)
	31-119918-4005	Screw, Pan Hd., 4-40 x 5/16 In.
	1-216741-411	Lockwasher, Spring, #4
	31-129647-40	Nut, Hex, #4-40
	CL-612972	Bracket Assembly
		----- * -----
J3	298040	BNC Connector, Receptacle
RP1	3-283274-102	Resistor Network, DIP, 8-1K Resistors
RP2	4-283274-103	Resistor Network, DIP, 7-10K Resistors
RP3	2-283274-102	Resistor Network, DIP, 13-1K Resistors
SW1	286142-8	DIP Switch, 8 Position
SW2	1-295641-1	DIP Switch, DPDT

DESIGNATION	PART NUMBER	DESCRIPTION
SW3	286142-3	DIP Switch, 3 Position
U1	296110	I.C., 8-Bit Microprocessor, 6809P
U2	292139	I.C., Progr. Peripheral Interface, 8255A
U3	Not Used	
U4	296674-244	I.C., H.S. CMOS, Octal Tri-State Buffer, 74HC244
U5	Not Used	
U6	296363-1	I.C., CMOS, 2K x 8 Static RAM, 6516
U7	CL-611651-05	I.C., Programmed EPROM, 4K x 8
U8	296674-154	I.C., H.S. CMOS, 4-16 Line Decoder, 74HC154
U9	296674-139	I.C., H.S. CMOS, Dual 2-4 Decoder, 74HC139
U10	296674-244	I.C., H.S. CMOS, Octal Tri-State Buffer, 74HC244
U11-U17	Not Used	
U18	296674-126	I.C., H.S. CMOS, Quad Buffer, 74HC126
U19	Not Used	
U20	296674-11	I.C., H.S. CMOS, Triple 3 Input AND Gate, 74HC11
U21	296674-00	I.C., H.S. CMOS, Quad NAND Gate, 74HC00
U22	290169-04	I.C., Low Power Schottky, Hex Inverter, 74LS04
U23	296674-04	I.C., H.S. CMOS, Hex Inverter, 74HC04
U24,U25	Not Used	
U26	295654	I.C., Quad RS-232C Line Driver, MC1488
U27	295653	I.C., Quad RS-232C Line Receiver, MC1489
U28,U29	Not Used	
U30	CL-210010	I.C., ACIA, 65C51
X1-X6	Not Used	
X7	288487-24	I.C. Socket, 24 Pin
X8-X23	Not Used	
X24	288487-24	I.C. Socket, 24 Pin
X25	285593-16	I.C. Socket, 16 Pin
Y1	289053-14	Crystal, 1.8432MHZ

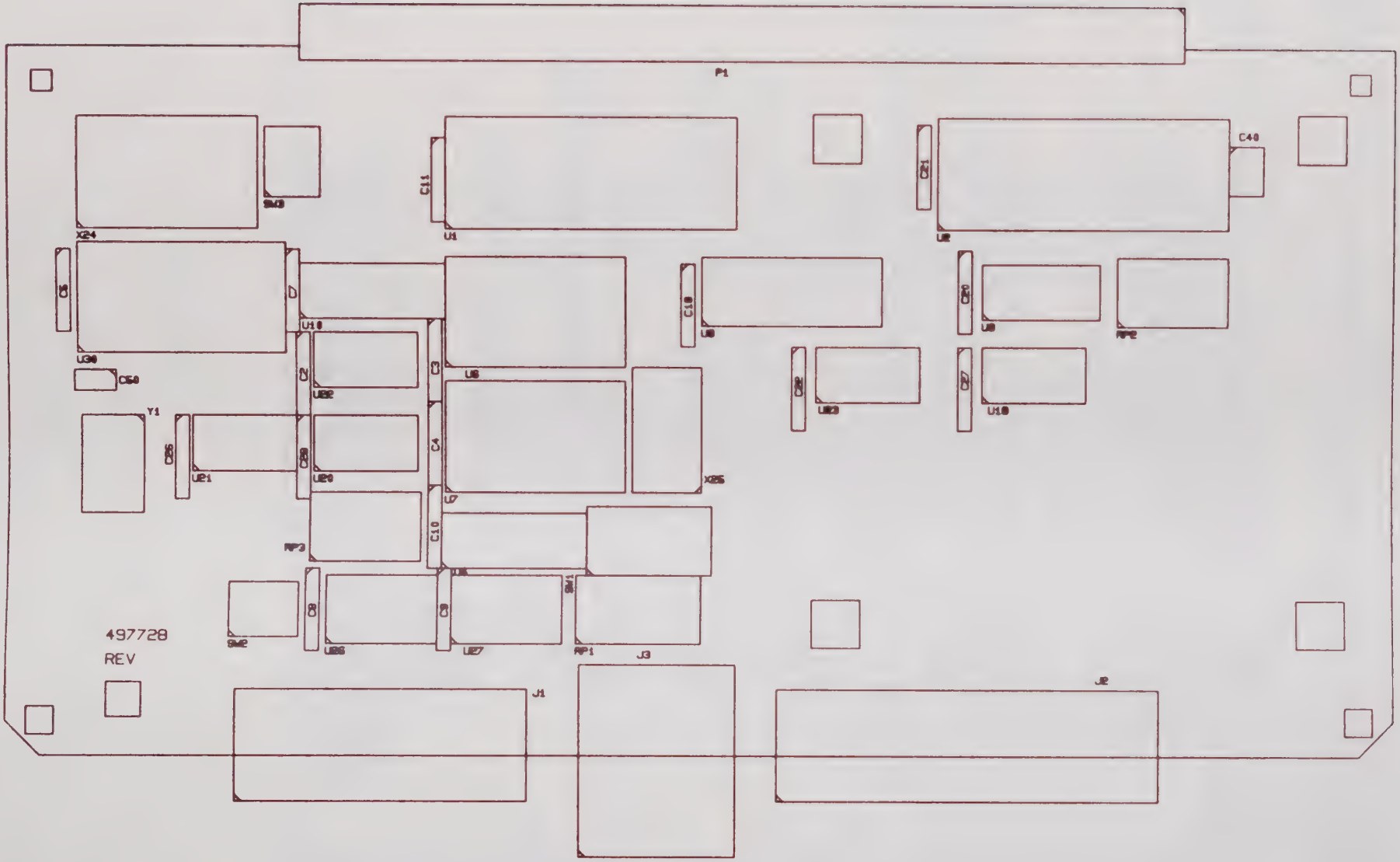


FIGURE 4-28 RS-232 INTERFACE BD.

DESIGNATION	PART NUMBER	DESCRIPTION
C1	287614-471	Capacitor, Monolithic, 50VDC, 470pF
C2	287614-224	Capacitor, Monolithic, 50VDC, 0.22UF
C3	262585-475	Capacitor, Tantalum, 20WVDC, 4.7UF
C5-C8	Not Used	
C9	287614-471	Capacitor, Monolithic, 50VDC, 470pF
C10	287614-333	Capacitor, Monolithic, 50VDC, 0.033UF
C11-C15	Not Used	
C16	287614-471	Capacitor, Monolithic, 50VDC, 470pF
C17	287614-333	Capacitor, Monolithic, 50VDC, 0.033UF
C18-C20	Not Used	
C21	287614-471	Capacitor, Monolithic, 50VDC, 470pF
C22	287614-333	Capacitor, Monolithic, 50VDC, 0.033UF
C23-C25	Not Used	
C26	287614-471	Capacitor, Monolithic, 50VDC, 470pF
C27	287614-333	Capacitor, Monolithic, 50VDC, 0.033UF
C28	Not Used	
C29	288755-104	Capacitor, Monolithic, 50VDC, 0.1UF
C30	262585-475	Capacitor, Tantalum, 20WVDC, 4.7UF
C31	295152-686	Capacitor, Electrolytic, 16WVDC, 68UF
C32	Not Used	
C33-C36	288755-224	Capacitor, Monolithic, 50VDC, 0.22UF
C37-C39	288755-104	Capacitor, Monolithic, 50VDC, 0.1UF
CB1	297966-3	Circuit Breaker, 1.5 Amp
CR1-CR4	263727	Diode, Zener, 10V, 1N6000B
JA-JD	CL-611874	Module Assy. Pen Adapter (A-P)
	297481-24	I.C. Socket, 24 pin
		----- * -----
J1-J4	293983-2	Connector, Male, 2 pin
R1	CL-210353-2	Resistor, Variable, Black Cap, 2K
R2	CL-210353-1	Resistor, Variable, Gray Cap, 2K
R3	CL-210353-2	Resistor, Variable, Black Cap, 2K
R4	CL-210353-1	Resistor, Variable, Gray Cap, 2K
R5	CL-210099-7500	Resistor, Metal Film, 1/4W, 1%, 750Ω
R6	CL-210099-6801	Resistor, Metal Film, 1/4W, 1%, 6.8K
R7	CL-210099-2701	Resistor, Metal Film, 1/4W, 1%, 2.7K
R8	CL-210099-7501	Resistor, Metal Film, 1/4W, 1%, 7.5K
R9	Not Used	
R10	269085-503	Potentiometer, Cermet, 50K
R11-R13	CL-210099-1002	Resistor, Metal Film, 1/4W, 1%, 10K
R14	CL-210096-5001	Resistor, Metal Film, 1/4W, 0.1%, 5K
R15	CL-210099-4753	Resistor, Metal Film, 1/4W, 1%, 475K
R16	267235	Jumper, Circuit. 22 AWG.
R17	Not Used	
R18	269085-502	Potentiometer, Cermet, 5K

DESIGNATION	PART NUMBER	DESCRIPTION
R19-R21	Not Used	
R22	1-281851-1R000	Resistor, Metal Film, 1/8W, 1%, 1Ω
R23-R25	CL-210099-1002	Resistor, Metal Film, 1/4W, 1%, 10K
R26	CL-210096-5001	Resistor, Metal Film, 1/4W, 0.1%, 5K
R27	CL-210099-4753	Resistor, Metal Film, 1/4W, 1%, 475K
R28	267235	Jumper, Circuit, 22 AWG.
R29	Not Used	
R30	269085-502	Potentiometer, Cermet, 5K
R31-R33	Not Used	
R34	1-281851-1R000	Resistor, Metal Film, 1/8W, 1%, 1Ω
R35	1-281851-20003	Resistor, Metal Film, 1/8W, 1%, 2 Meg
R36	267235	Jumper, Circuit, 22 AWG.
R37-R42	Not Used	
R43	267235	Jumper, Circuit, 22 AWG.
R44,R45	Not Used	
R46	1-281851-1R000	Resistor, Metal Film, 1/8W, 1%, 1Ω
R47	1-281851-20003	Resistor, Metal Film, 1/8W, 1%, 2 Meg
R48	267235	Jumper, Circuit, 22 AWG.
R49-R53	Not Used	
R54	267235	Jumper, Circuit, 22 AWG.
R55-R58	Not Used	
R59	1-281851-1R000	Resistor, Metal Film, 1/8W, 1%, 1Ω
R60	269085-502	Potentiometer, Cermet, 5K
R61	Not Used	
R62	269085-502	Potentiometer, Cermet, 5K
R63	Not Used	
R64	CL-210099-7500	Resistor, Metal Film, 1/4W, 1%, 750Ω
RN1	Not Used	
RN2,RN3	CL-210216-102	Resistor Network, SIP 4-1K Resistors
RN4,RN5	Not Used	
RN6	CL-211433-603	Resistor Network, SIP 4-60K Resistors
RN7	CL-211433-403	Resistor Network, SIP 4-40K Resistors
RN8	CL-210216-103	Resistor Network, SIP 4-10K Resistors
RN9,RN10	CL-211433-103	Resistor Network, SIP 4-10K Resistors
U1	CL-210224	I.C., Frequency to Voltage Converter, LM2917
U2	CL-213816	I.C., Quad FET Switch, LF13333N
U3-U5	CL-210226-1	I.C., Dual Operational Amplifier, LT1013DN8
U6-U9	CL-210225	I.C., Regulating Pulse Width Modulator, LM3524
U10.	296613	I.C., Transistor Array, NPN, 4-Transistors, MPQ3725
U11	296603	I.C., Diode Array, 8-Diodes, FSA2619P
U12	289897	Voltage Regulator, -5V, MC79L05CP
U13,U14	CL-210226-1	I.C., Dual Operational Amplifier, LT1013DN8
	CL-610876	Foam Strip
	249438-13	Spacer/Standoff

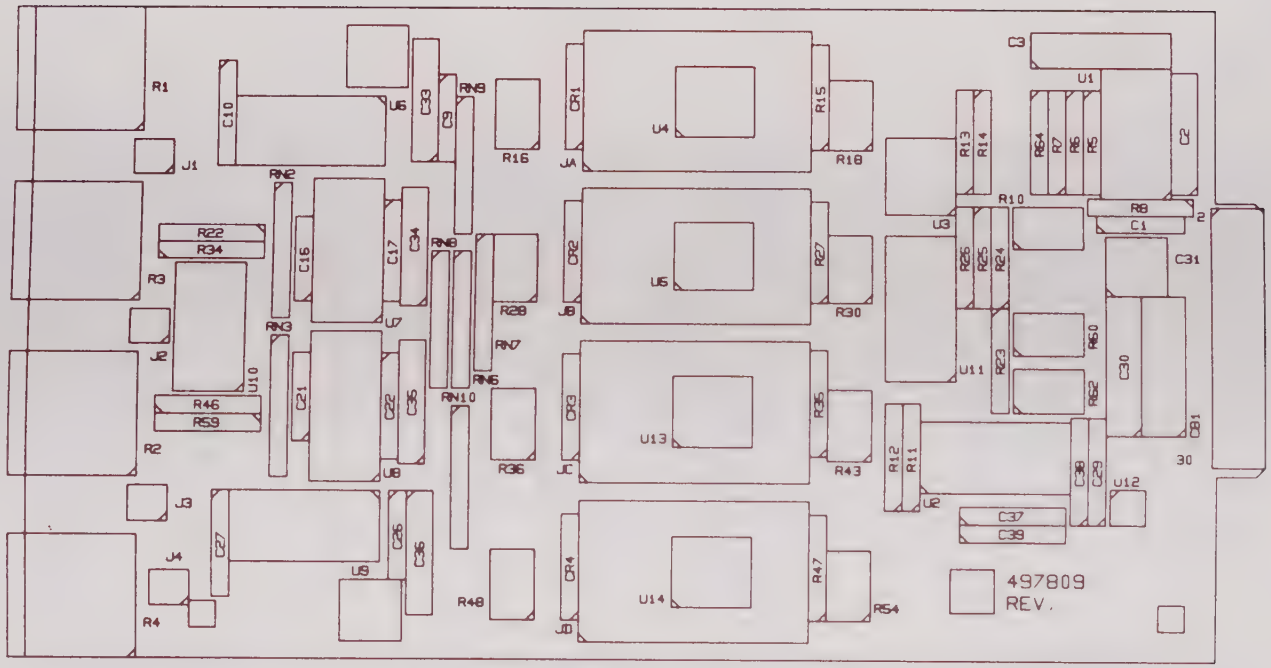


FIGURE 4-29 PEN HEAT CONTROL BD.

DESIGNATION	PART NUMBER	DESCRIPTION
C101-C116	Not Used	
C117-C119	288755-104	Capacitor, Monolithic, 50VDC, 0.1UF
C120	283943-107	Capacitor, Tantalum, 20WVDC, 100UF
C121	Not Used	
C122	263386-108	Capacitor, Electrolytic, 25WVDC, 1000UF
C123	288755-224	Capacitor, Monolithic, 50VDC, 0.22UF
C124	288755-104	Capacitor, Monolithic, 50VDC, 0.1UF
C125	10-288757-221	Capacitor, Mono-Glass, 50VDC, 10%, 220PF
C126	287614-103	Capacitor, Monolithic, 50VDC, 0.01UF
D101	269256-7	Diode, 1A, 1N4007
D102-D107	296616	Diode, Barrier, 1A, 1N5818
D108-D129	Not Used	
D130-D136	269256-7	Diode, 1A, 1N4007
D137	280870-4	Zener Diode 17V
FB1-FB12	Not Used	
FB13,FB14	297712	Ferrite Bead, Axial
J101-J103	Not Used	
J-104	292715-15	Connector, Dbl. Sdd, Edge On, Fem., 30 Pin (A-P)
	31-119918-4008	Screw, Pan Hd., 4-40 x 1/2 In.
	243104-5	Washer, Nylon, #4
	1-216741-410	Lockwasher, Spring, #4
	31-119998-40	Nut, Hex, #4-40
		----- * -----
J105-J107	Not Used	
J108	292715-15	Connector, Dbl. Sdd, Edge On, Fem., 30 Pin (A-P)
	31-119918-4008	Screw, Pan Hd., 4-40 x 1/2 In.
	243104-5	Washer, Nylon, #4
	1-216741-410	Lockwasher, Spring, #4
	31-119998-40	Nut, Hex, #4-40
		----- * -----
J109	294310-4	Connector, Rt. Angle w/Lock, Male, 4 Pin
J110-J116	Not Used	
J117	294310-4	Connector, Rt. Angle w/Lock, Male, 4 Pin
J118,J119	Not Used	
J120	1-292529-40	Connector, Rt. Angle, Dbl Row, Male, 40 Pin (A-P)
	31-119918-2607	Screw, Pan Hd., 2-56 x 7/16 In.
	243104-5	Washer, Nylon, #4
	1-216741-401	Lockwasher, Spring, #2
	31-119998-26	Nut, Hex, #2-56
	293337	Key, Polarization
		----- * -----
J121	297976-13	Connector, Flat, 13 Contacts
J122-J125	Not Used	
J126	270270-1	Terminal, Quick Disconnect (A-P)
	16-107283-5	Rivet, Semi-Tubular
		----- * -----

DESIGNATION	PART NUMBER	DESCRIPTION
J127,J128	Not Used	
J129	270270-1	Terminal, Quick Disconnect (A-P)
	16-107283-5	Rivet, Semi-Tubular
		----- * -----
J130	1-292529-40	Connector, Rt. Angle, Dbl Row, Male, 40 Pin (A-P)
	31-119918-2607	Screw, Pan Hd., 2-56 x 7/16 In.
	243104-5	Washer, Nylon, #4
	1-216741-401	Lockwasher, Spring, #2
	31-119998-26	Nut, Hex, #2-56
	293337	Key, Polarization
		----- * -----
J131	Not Used	
J132	1-292529-10	Connector, Rt. Angle, Dbl Row, Male, 10 Pin (A-P)
	31-119918-2607	Screw, Pan Hd., 2-56 x 7/16 In.
	243104-5	Washer, Nylon, #4
	1-216741-401	Lockwasher, Spring, #2
	31-119998-26	Nut, Hex, #2-56
	293337	Key, Polarization
		----- * -----
J133-J139	Not Used	
J140	294310-4	Connector, Rt. Angle w/Lock, Male, 4 Pin
Q101,Q102	CL-211006	Transistor, Darlington, TIP120 (A-P)
	293324-1	Heat Sink
	293848-3	Insulator,Sil-Pad
	31-119918-4006	Screw, Pan Hd., 4-40 x 3/8 In.
	1-216741-410	Lockwasher, Spring, #4
	31-119998-40	Nut, Hex, #4-40
		----- * -----
R101,R102	CL-210099-1002	Resistor, Metal Film, 1/4W, 1%, 10K
R103-R119	Not Used	
R120,R121	CL-210099-2000	Resistor, Metal Film, 1/4W, 1%, 200 Ohms
R122	CL-210099-1001	Resistor, Metal Film, 1/4W, 1%, 1K
R123-R127	Not Used	
R128	5-115558-100	Resistor, Carbon, 1W, 5%, 10 Ohms
R129	Not Used	
R130,R131	CL-210099-1002	Resistor, Metal Film, 1/4W, 1%, 10K
R132	CL-210099-2204	Resistor, Metal Film, 1/4W, 1%, 2.2 Meg
R133	CL-210099-3000	Resistor, Metal Film, 1/4W, 1%, 300 Ohms
R134	CL-210099-1002	Resistor, Metal Film, 1/4W, 1%, 10K
RN101	CL-211150-330	Resistor Network, SIP, 4-33 Ohm Resistors
U101-U116	Not Used	
U117	CL-211012	I.C., Dual NOR Gate Driver, 75473
U118	296512	I.C., Dual AND Gate Driver, 75472
U119	Not Used	
U120	296512	I.C., Dual AND Gate Driver, 75472
U121	296674-123	I.C., H.S. CMOS, Dual Monostable, 74HC123

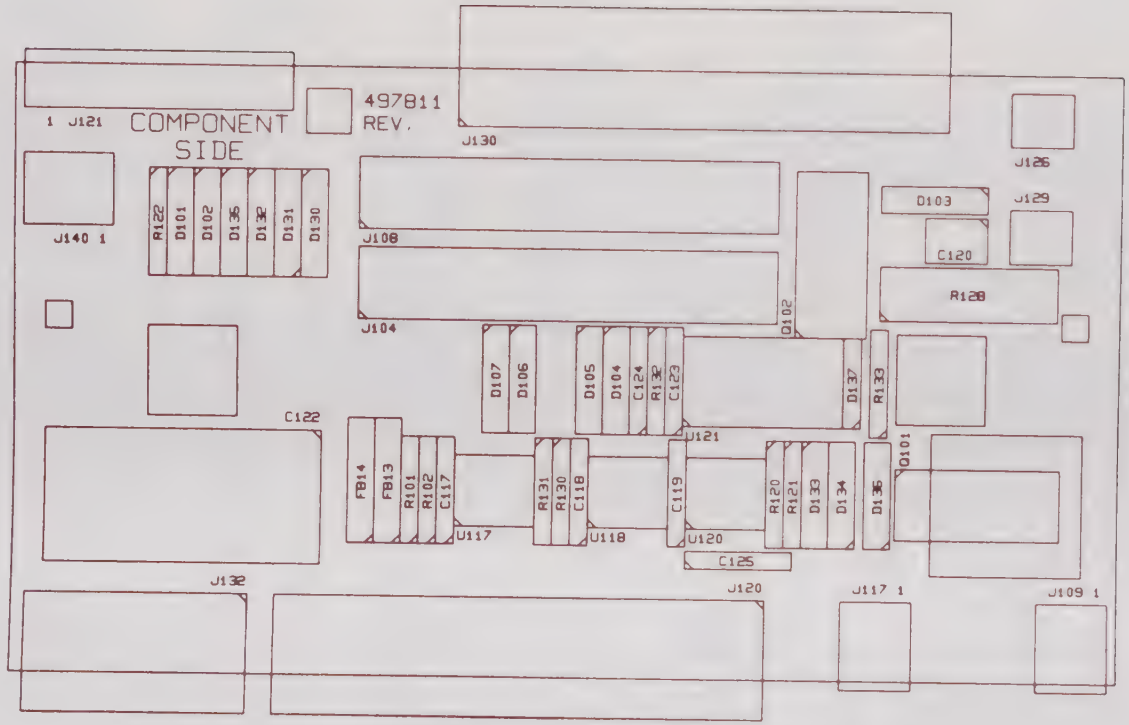


FIGURE 4-30 RS 3200 MOTHER-IN-LAW BD.

DESIGNATION	PART NUMBER	DESCRIPTION
C101-C114	Not Used	
C115-C119	288755-104	Capacitor, Monolithic, 50VDC, 0.1UF
C120	283943-107	Capacitor, Tantalum, 20WVDC, 100UF
C121	Not Used	
C122	263386-108	Capacitor, Electrolytic, 25WVDC, 1000UF
C123	288755-224	Capacitor, Monolithic, 50VDC, 0.22UF
C124	288755-104	Capacitor, Monolithic, 50VDC, 0.1UF
C125	10-288757-221	Capacitor, Mono-Glass, 50VDC, 10%, 220PF
C126	287614-103	Capacitor, Monolithic, 50VDC, 0.01UF
D101	269256-7	Diode, 1A, 1N4007
D102-D111	296616	Diode, Barrier, 1N5818
D112-D129	Not Used	
D130-D136	269256-7	Diode, 1A, 1N4007
D137	280870-4	Zener Diode 17V
FB1-FB8	Not Used	
FB9-FB14	297712	Ferrite Bead, Axial
J101,J102	Not Used	
J103,J104	292715-15	Connector, Dbl. Sdd, Edge On, Fem., 30 Pin (A-P)
	31-119918-4008	Screw, Pan Hd., 4-40 x 1/2 In.
	243104-5	Washer, Nylon, #4
	1-216741-410	Lockwasher, Spring, #4
	31-119998-40	Nut, Hex, #4-40
		----- * -----
J105,J106	Not Used	
J107,J108	292715-15	Connector, Dbl. Sdd, Edge On, Fem., 30 Pin (A-P)
	31-119918-4008	Screw, Pan Hd., 4-40 x 1/2 In.
	243104-5	Washer, Nylon, #4
	1-216741-410	Lockwasher, Spring, #4
	31-119998-40	Nut, Hex, #4-40
		----- * -----
J109	294310-4	Connector, Rt. Angle w/Lock, Male, 4 Pin
J110-J114	Not Used	
J115-J117	294310-4	Connector, Rt. Angle w/Lock, Male, 4 Pin
J118	Not Used	
J119	1-292529-40	Connector, Rt. Angle, Dbl Row, Male, 40 Pin (A-P)
	31-119918-2607	Screw, Pan Hd., 2-56 x 7/16 In.
	243104-5	Washer, Nylon, #4
	1-216741-401	Lockwasher, Spring, #2
	31-119998-26	Nut, Hex, #2-56
	293337	Key, Polarization
		----- * -----
J120	Not Used	
J121	297976-13	Connector, Flat, 13 Contacts
J122-J125	Not Used	
J126	270270-1	Terminal, Quick Disconnect (A-P)
	16-107283-5	Rivet, Semi-Tubular
		----- * -----

DESIGNATION	PART NUMBER	DESCRIPTION
J127,J128	Not Used	
J129	270270-1	Terminal, Quick Disconnect (A-P)
	16-107283-5	Rivet, Semi-Tubular
		----- * -----
J130	1-292529-40	Connector, Rt. Angle, Dbl Row, Male, 40 Pin (A-P)
	31-119918-2607	Screw, Pan Hd., 2-56 x 7/16 In.
	243104-5	Washer, Nylon, #4
	1-216741-401	Lockwasher, Spring, #2
	31-119998-26	Nut, Hex, #2-56
	293337	Key, Polarization
		----- * -----
J131	Not Used	
J132	1-292529-10	Connector, Rt. Angle, Dbl Row, Male, 10 Pin (A-P)
	31-119918-2607	Screw, Pan Hd., 2-56 x 7/16 In.
	243104-5	Washer, Nylon, #4
	1-216741-401	Lockwasher, Spring, #2
	31-119998-26	Nut, Hex, #2-56
	293337	Key, Polarization
		----- * -----
J133-J139	Not Used	
J140	294310-4	Connector, Rt. Angle w/Lock, Male, 4 Pin
Q101,Q102	CL-211006	Transistor, Darlington, TIP120 (A-P)
	293324-1	Heat Sink
	293848-3	Insulator,Sil-Pad
	31-119918-4006	Screw, Pan Hd., 4-40 x 3/8 In.
	1-216741-410	Lockwasher, Spring, #4
	31-119998-40	Nut, Hex, #4-40
		----- * -----
R101-R106	CL-210099-1002	Resistor, Metal Film, 1/4W, 1%, 10K
R107-R119	Not Used	
R120,R121	CL-210099-2000	Resistor, Metal Film, 1/4W, 1%, 200 Ohms
R122	CL-210099-1001	Resistor, Metal Film, 1/4W, 1%, 1K
R123-R127	Not Used	
R128	5-115558-100	Resistor, Carbon, 1W, 5%, 10 Ohms
R129	Not Used	
R130,R131	CL-210099-1002	Resistor, Metal Film, 1/4W, 1%, 10K
R132	CL-210099-2204	Resistor, Metal Film, 1/4W, 1%, 2.2 Meg
R133	CL-210099-3000	Resistor, Metal Film, 1/4W, 1%, 300 Ohms
R134	CL-210099-1002	Resistor, Metal Film, 1/4W, 1%, 10K
RN101	CL-211150-330	Resistor Network, SIP, 4-33 Ohm Resistors
U101-U114	Not Used	
U115-U117	CL-211012	I.C., Dual NOR Gate Driver, 75473
U118	296512	I.C., Dual AND Gate Driver, 75472
U119	Not Used	
U120	296512	I.C., Dual AND Gate Driver, 75472
U121	296674-123	I.C., H.S. CMOS, Dual Monostable, 74HC123

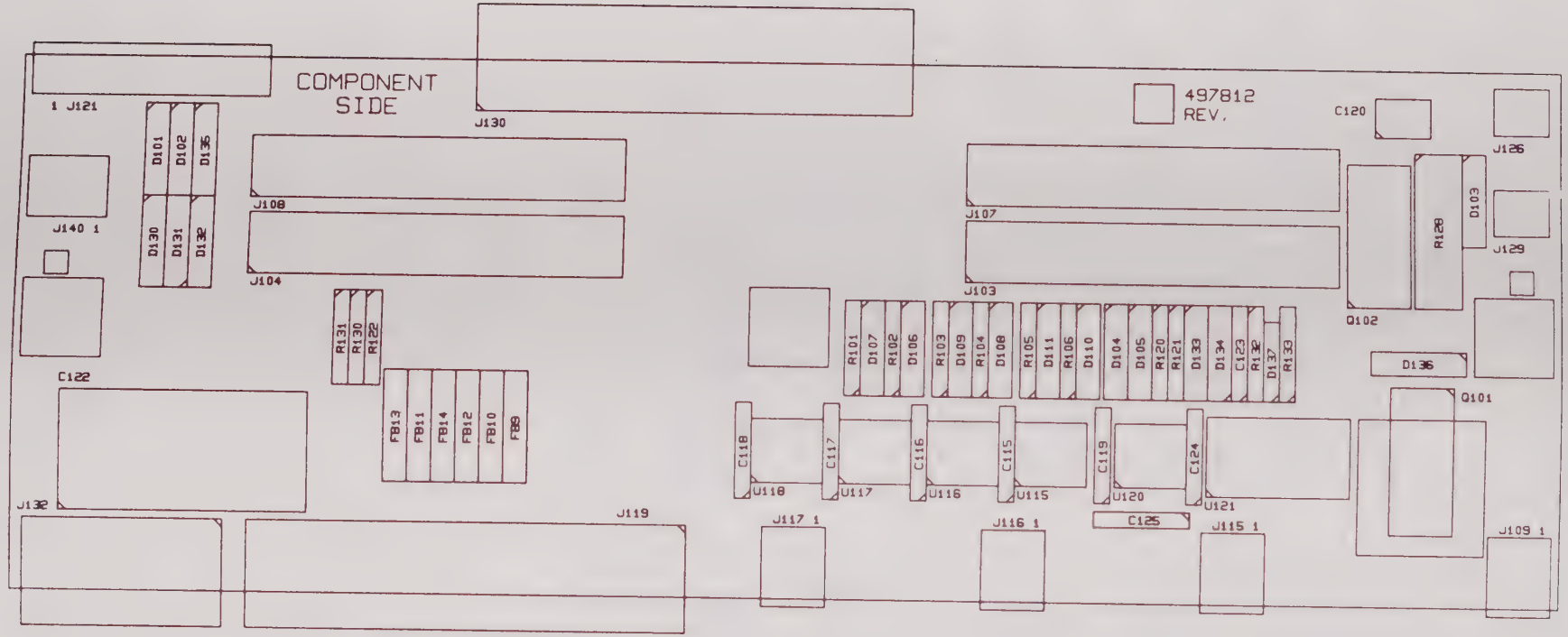


FIGURE 4-31 RS 3400 MOTHER-IN-LAW BD.

DESIGNATION	PART NUMBER	DESCRIPTION
C1-C5	288755-104	Capacitor, Monolithic, 50VDC, 0.1UF
C6	Not Used	
C7-C14	288755-104	Capacitor, Monolithic, 50VDC, 0.1UF
C15	10-263695-105	Capacitor, Tantalum, 20WVDC, 10%, 1UF
C16	283943-156	Capacitor, Tantalum, 20WVDC, 20%, 15UF
C17	295462-685	Capacitor, Lytic, 40WVDC, +50%-10%, 6.8UF
J201	CL-710329	Cable, Assembly
L1	291224-1	Inductor, 10%, 0.25 ohms, 8.2UH
R1	CL-210099-1001	Resistor, Metal Film, 1/4W, 1%, 1K
SW1-SW16	CL-210198	Switch, Pushbutton, SPST, B3W-4155
SW17-SW47	297909-2	Switch, Pushbutton, SPST, B3W-1152
SW48	Not Used	
SW49-SW52	297909-2	Switch, Pushbutton, SPST, B3W-1152
U1	296674-138	I.C., H.S. CMOS, 3-8 Decoder, 74HC138
U2	CL-210194	I.C., Keyboard/Display Interface, 8279
U3	296674-138	I.C., H.S. CMOS, 3-8 Decoder, 74HC138
U4	296674-32	I.C., H.S. CMOS, Quad OR Gate, 74HC32
U5,U6	Not Used	
U7	CL-210195	I.C., CMOS, 16 Key Encoder, 74C922N
U8	296674-368	I.C., H.S. CMOS, Hex Tri-State Buffer, 74HC368
U9	296674-244	I.C., H.S. CMOS, Octal Tri-State Buffer, 74HC244
U10-U14	CL-210193	I.C., VF Display Driver, 75512
VFD	CL-210199	Vacuum Fluorescent Display, DC164A2
	CL-212404	Spacer, Sleeve, 1/4 In.

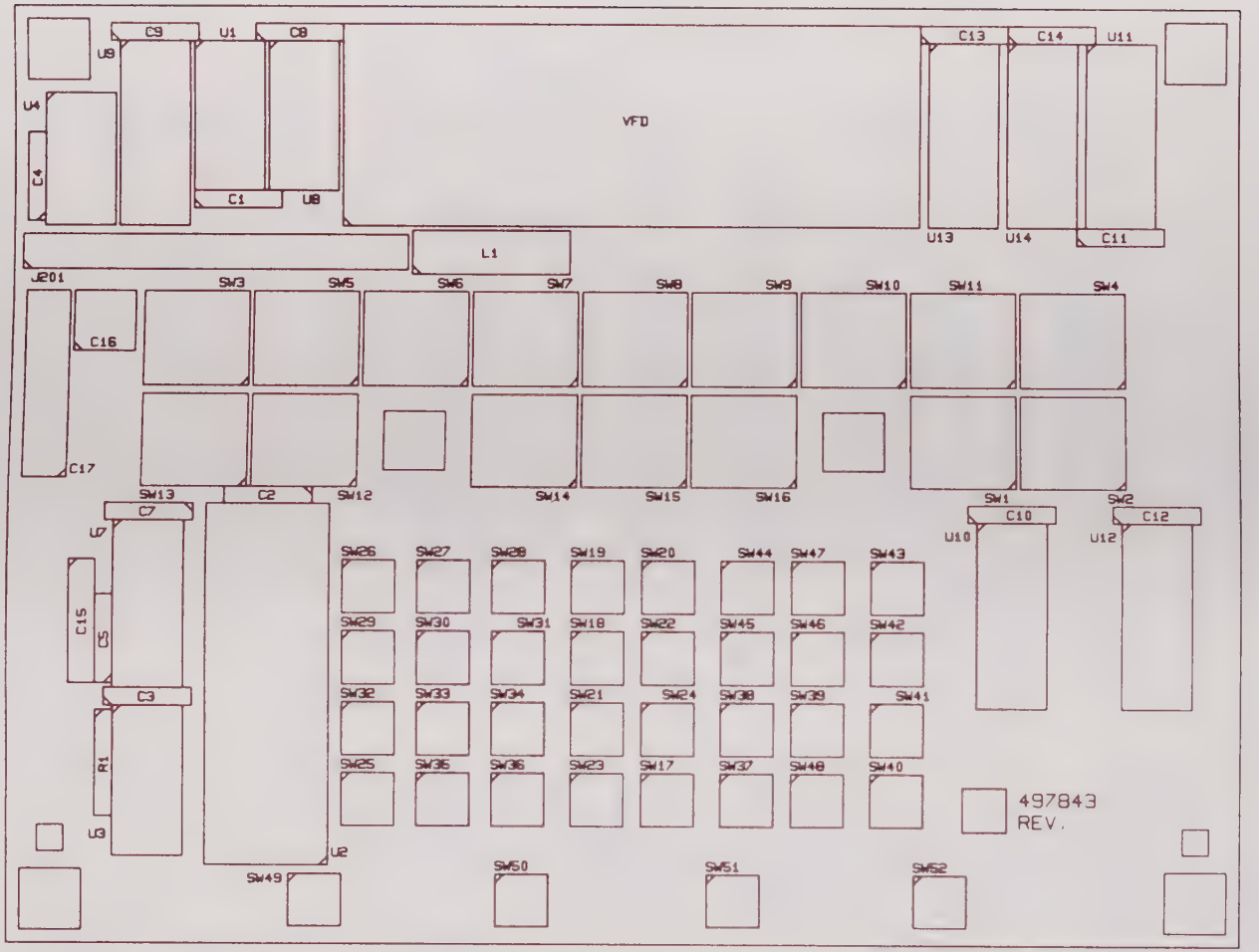


FIGURE 4-32 RS 3200 KEYBOARD BD.

DESIGNATION	PART NUMBER	DESCRIPTION
C1-C5	288755-104	Capacitor, Monolithic, 50VDC, 0.1UF
C6	Not Used	
C7-C14	288755-104	Capacitor, Monolithic, 50VDC, 0.1UF
C15	10-263695-105	Capacitor, Tantalum, 20WVDC, 10%, 1UF
C16	283943-156	Capacitor, Tantalum, 20WVDC, 20%, 15UF
C17	295462-685	Capacitor, Lytic, 40WVDC, +50%-10%, 6.8UF
J201	CL-710329	Cable, Assembly
L1	291224-1	Inductor, 10%, 0.25 ohms, 8.2UH
R1	CL-210099-1001	Resistor, Metal Film, 1/4W, 1%, 1K
SW1-SW16	CL-210198	Switch, Pushbutton, SPST, B3W-4155
SW17-SW47	297909-2	Switch, Pushbutton, SPST, B3W-1152
SW48	Not Used	
SW49-SW56	297909-2	Switch, Pushbutton, SPST, B3W-1152
U1	296674-138	I.C., H.S. CMOS, 3-8 Decoder, 74HC138
U2	CL-210194	I.C., Keyboard/Display Interface, 8279
U3	296674-138	I.C., H.S. CMOS, 3-8 Decoder, 74HC138
U4	296674-32	I.C., H.S. CMOS, Quad OR Gate, 74HC32
U5,U6	Not Used	
U7	CL-210195	I.C., CMOS, 16 Key Encoder, 74C922N
U8	296674-368	I.C., H.S. CMOS, Hex Tri-State Buffer, 74HC368
U9	296674-244	I.C., H.S. CMOS, Octal Tri-State Buffer, 74HC244
U10-U14	CL-210193	I.C., VF Display Driver, 75512
VFD	CL-210199	Vacuum Fluorescent Display, DC164A2
	CL-212404	Spacer, Sleeve, 1/4 In.

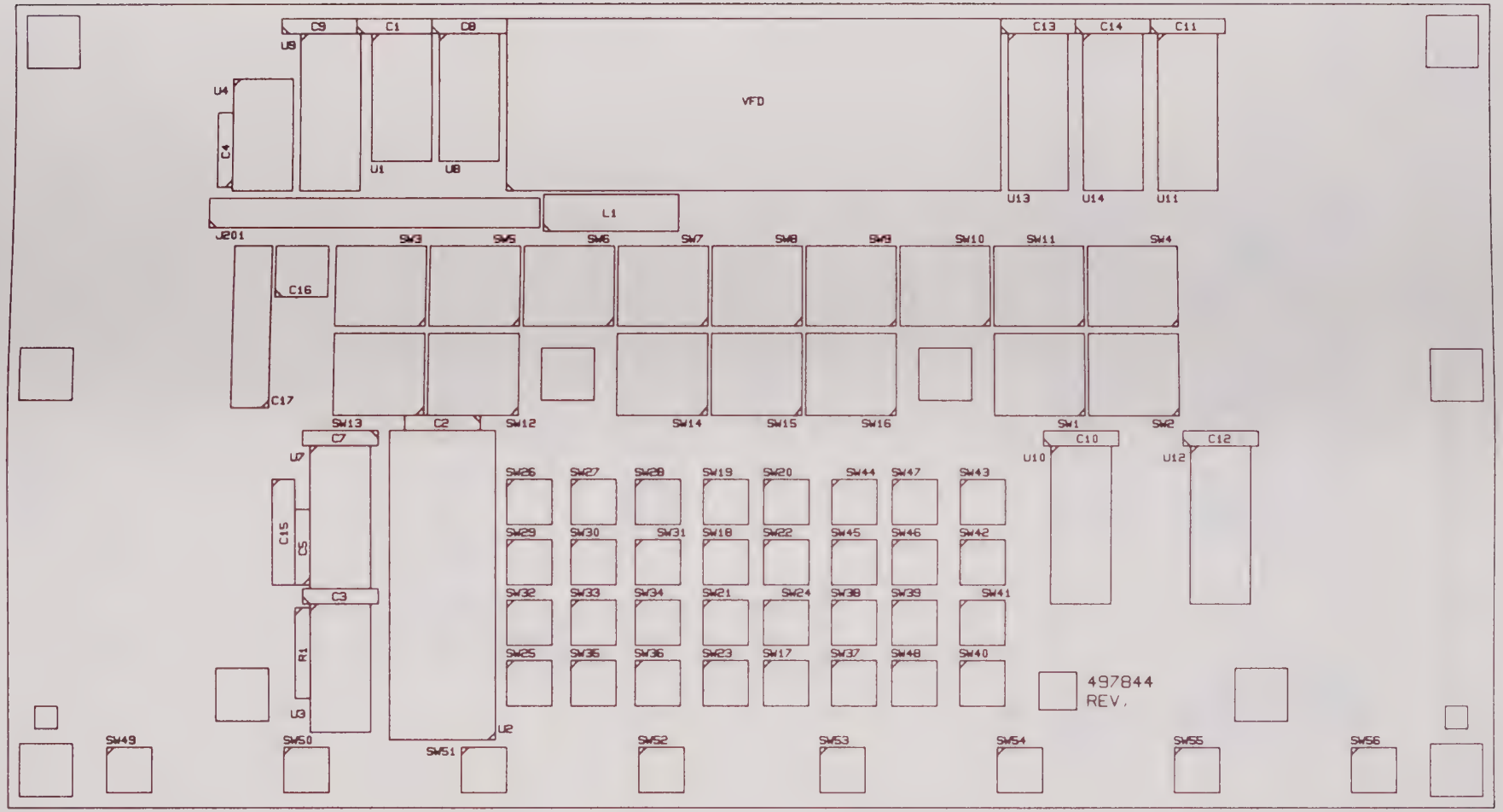
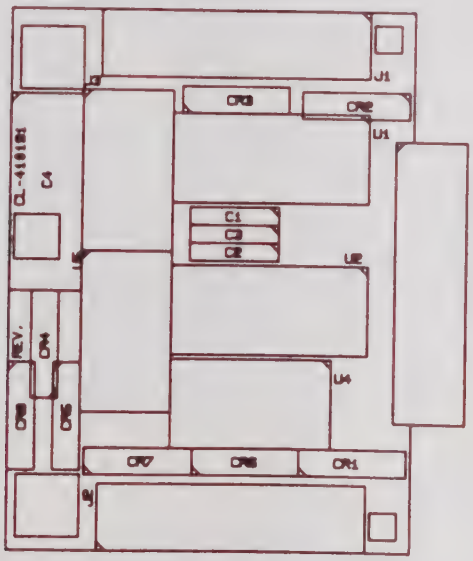


FIGURE 4-33 RS 3400 KEYBOARD BD.

RS 3200 & RS 3400
PC BOARD ASSY., INTERCHANNEL ANNOTATION DRIVER CL-810191
FIGURE 4-34

DESIGNATION	PART NUMBER	DESCRIPTION
C1-C3	288755-103	Capacitor, Monolithic, 50VDC, 0.01UF
C4	294666-227	Cap., Electrolytic, 25WVDC, 20%, 220UF
CR1	269256-7	Diode, 1A, 1N4007
CR2-CR5	296616	Diode, Barrier, 1N5818
CR6-CR8	269256-7	Diode, 1A, 1N4007
J1,J2	297976-13	Connector, Flat, 13 Contacts
U1,U2	296674-273	I.C., H.S. CMOS, Octal D Flip-Flop, 74HC273
U3,U4	289759	I.C., Darlington Transistor Array, ULN2003
U5	296674-138	I.C., H.S. CMOS, 3-8 Line Decoder, 74HC138
	249438-13	Spacer, Brass Riveted, 1/2 In.

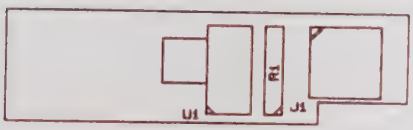


RS 3200 & RS 3400
PC BOARD ASSY., PAPER OUT SENSOR CL-810240
FIGURE 4-35

DESIGNATION	PART NUMBER	DESCRIPTION
J1	294310-6	Connector Rt. Angle, Male, 6 Pin
Q1	281702-2	Transistor, NPN, 2N4401
R1	CL-210099-1002	Resistor, Metal Film, 1/4W, 1%, 10K
U1	298042	Photo, Sensor, Reflective (A-P)
	243104-5	Insulator, Nylon, #4
		----- * -----
	247155-40	Clinch Nut, #4-40

RS 3200 & RS 3400
PC BOARD ASSY., SPEED MONITOR CL-810290
FIGURE 4-36

DESIGNATION	PART NUMBER	DESCRIPTION
J1	294310-4	Connector, Rt. Angle, Male, 4 Pin
R1	CL-210099-2200	Resistor, Metal Film, 1/4W, 1%, 220 Ohms
U1	CL-210335-1	Photo Sensor/Emitter



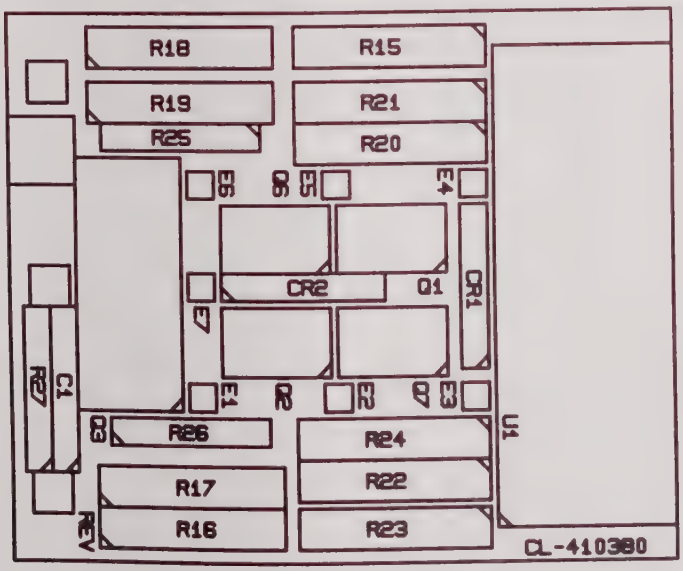
PC BOARD ASSY., STANDARD DUMMY INTERFACE CL-810312
FIGURE 4-37

DESIGNATION	PART NUMBER	DESCRIPTION
EJ1	290306-1	Card Ejector, White
EJ2	290306-2	Card Ejector, Red
J1	Not Used	
J2	296509-37	Connector, Rt. Angle Female, P.C. Mount, 37 pin (A-P)
	CL-612972	Bracket Assy.
	31-119918-4005	Screw, Pan Hd., 4-40 x 5/16 In.
	1-216741-411	Lockwasher, Spring, #4
	31-129647-40	Nut, Hex, #4-40

FIGURE 4-37 STANDARD DUMMY INTERFACE BD.

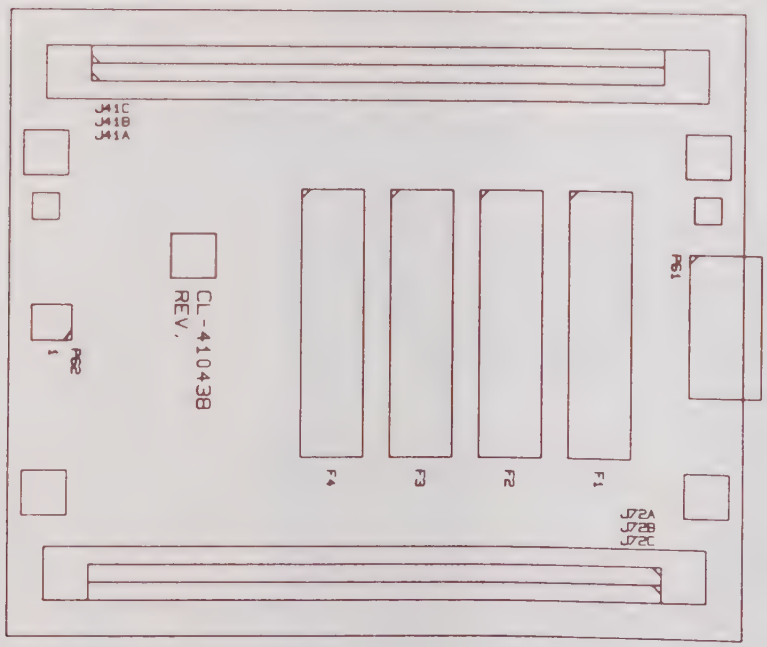
RS 3200 & RS 3400
PC BOARD ASSY., PEN SERVO OUTPUT MODULE CL-810380
FIGURE 4-38

DESIGNATION	PART NUMBER	DESCRIPTION
C1	288755-104	Capacitor, Monolithic, 50VDC, 0.1UF
CR1,CR2	243050	Diode, Zener, 4.7V, 1N750A
E1-E7	CL-210476	Pin, Electrical, Spacer
Q1,Q2	298050	Transistor, N-Channel, MOSFET, IRFD 1Z3
Q3	298048	Transistor, N-Channel, Power MOSFET, IRF 531
		(A-P)
	243104-5	Nylon Washer
	31-119918-4005	Screw, Machine, Pan Hd., 4-40 x 5/16 In.
	243898-40	Nut, Assembled Lockwasher, #4-40
		----- * -----
Q4,Q5	Not Used	
Q6,Q7	298050	Transistor, N-Channel, MOSFET, IRFD 1Z3
R1-R14	Not Used	
R15	5-115557-472	Resistor, Carbon Composition, 1/2 W, 5%, 4.7K
R16-R23	5-115557-181	Resistor, Carbon Composition, 1/2 W, 5%, 180Ω
R24	5-115557-472	Resistor, Carbon Composition, 1/2 W, 5%, 4.7K
R25	CL-210099-5001	Resistor, Metal Film, 1/4 W, 1%, 5K
R26	CL-210099-1002	Resistor, Metal Film, 1/4 W, 1%, 10K
R27	5-41111-104	Resistor, Carbon Composition, 1/4 W, 5%, 100K
U1	CL-210381	I.C., HEXFET Power Hybrid, IRFT 003
		(A-P)
	CL-310474	Heat Sink
	293848-10	Insulator, Heat Sink
	13-262716-4006	Screw, Self Tapping, 4-40 x 3/8 In.
	265742-10	Spacer, Teflon, 0.187 In.



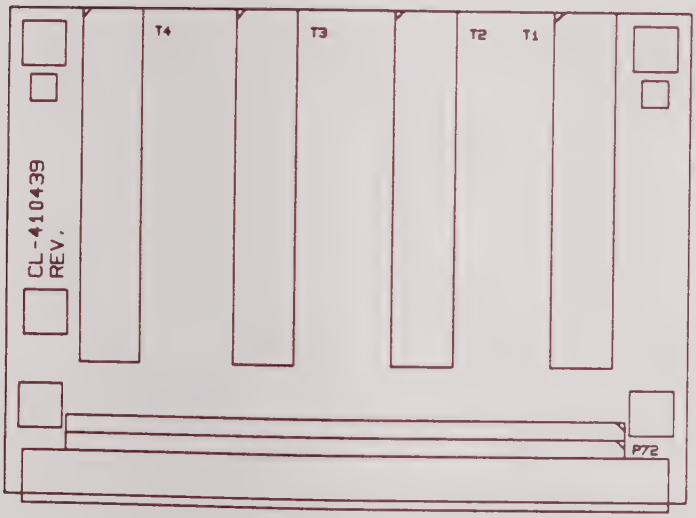
RS 3200 & RS 3400
PC BOARD ASSY., RS 3400 INTERCONNECT CL-810438
FIGURE 4-39

DESIGNATION	PART NUMBER	DESCRIPTION
F1-F4	102625-7	Fuse 1 Amp, 3AG, Quick Acting
FC1-FC8	285577	Fuse Clip (Not Shown)
J1-J40	Not Used	
J41	CL-210499-96	Connector, Female, 96 Contacts (A-P)
	31-119918-2604	Screw, Pan Hd., 2-56 x 1/4 In.
	31-119998-26	Nut, Hex #2-56
	----- * -----	
J42-J71	Not Used	
J72	CL-210499-96	Connector, Female, 96 Contacts (A-P)
	31-119918-2604	Screw, Pan Hd., 2-56 x 1/4 In.
	31-119998-26	Nut, Hex #2-56
	----- * -----	
P1-P60	Not Used	
P61	294310-8	Connector, Rt. Angle, Male, 8 Pin
P62	1-293983-2	Connector, Male, 2 Pin



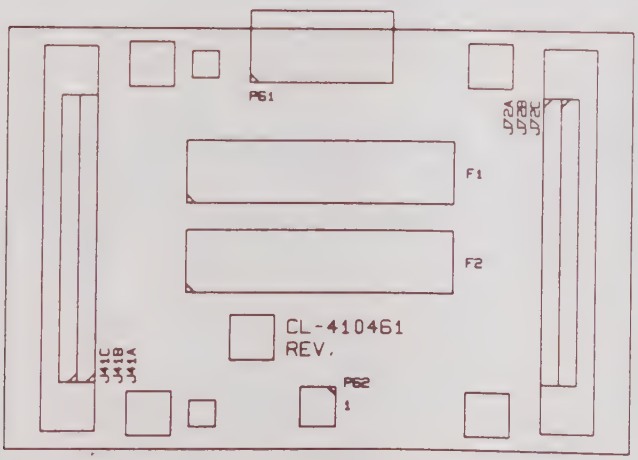
RS 3200 & RS 3400
PC BOARD ASSY., RS 3400 MEDICAL OUTPUT CL-810439-1
FIGURE 4-40

DESIGNATION	PART NUMBER	DESCRIPTION
P1-P71	Not Used	
P72	297818-96	Connector, DIN, Rt. Angle, 96 Contacts (A-P)
	31-119918-2606	Screw, Pan Hd., 2-56 x 3/8 In.
	31-119998-26	Nut, Hex, #2-56
		----- * -----
T1-T4	CL-212384-10	Terminal Block, 10 Position



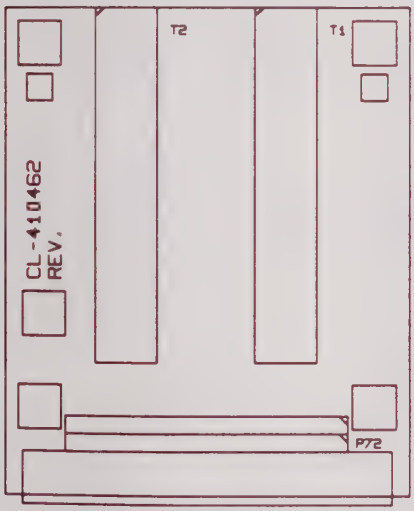
RS 3200 & RS 3400
PC BOARD ASSY., RS 3200 INTERCONNECT CL-810461
FIGURE 4-41

DESIGNATION	PART NUMBER	DESCRIPTION
F1,F2	102625-7	Fuse, 1 Amp, 3AG, Quick Acting
FC1-FC4	285577	Fuse Clip (Not Shown)
J1-J40	Not Used	
J41	CL-210499-48	Connector, Female, 48 Contacts (A-P)
	31-119918-2604	Screw, Pan Hd., 2-56 x 1/4 In.
	31-119998-26	Nut, Hex, #2-56
	----- * -----	
J42-J71	Not Used	
J72	CL-210499-48	Connector, Female, 48 Contacts (A-P)
	31-119918-2604	Screw, Pan Hd., 2-56 x 1/4 In.
	31-119998-26	Nut, Hex, #2-56
	----- * -----	
P1-P60	Not Used	
P61	294310-8	Connector, Rt., Angle, Male, 8 Pin
P62	1-293983-2	Connector, Male, 2 Pin



RS 3200 & RS 3400
PC BOARD ASSY., RS 3200 MEDICAL OUTPUT CL-810462-1
FIGURE 4-42

DESIGNATION	PART NUMBER	DESCRIPTION
P1-P71	Not Used	
P72	297818-48	Connector, DIN, Rt. Angle, 96 Contacts (A-P)
	31-119918-2606	Screw, Pan Hd., 2-56 x 3/8 In.
	31-119998-26	Nut, Hex, #2-56
		----- * -----
T1-T2	CL-212384-10	Terminal Block, 10 Position



DESIGNATION	PART NUMBER	DESCRIPTION
C1,C2	283943-106	Capacitor, Tantalum, 20WVDC, 20%, 10UF
C3	240352-101	Capacitor, Ceramic, 1000WVDC, 100PF
C4-C30	288755-103	Capacitor, Monolithic, 50VDC, 0.01UF
C31	240352-101	Capacitor, Ceramic, 1000WVDC, 100PF
CR1	280440	Diode, 220ma, 1N4148
CR2	289396	LED, Red, LL201R
P1-P51	Not Used	
P52	1-292529-26	Connector, Rt. Angle, 26 Pin (A-P)
	31-119918-2607	Screw, Pan Hd., 2-56 x 7/16 In.
	31-119998-26	Nut, Hex, #2-56
	293337	Key, Polorizing
		----- * -----
R1	5-241111-222	Resistor, Carbon, 1/4W, 5%, 2.2K
R2,R3	5-241111-103	Resistor, Carbon, 1/4W, 5%, 10K
R4	5-241111-331	Resistor, Carbon, 1/4W, 5%, 330 Ohms
RP1-RP6	3-283274-103	Resistor Network, DIP, 8-10K Resistors
SW1	286142-3	DIP Switch, 3 Position
U1	296110	I.C., 8-Bit Mircoprocessor, MC6809P
U2	296519-1	Crystal, 4MHZ
U3,U4	296674-244	I.C., H.S. CMOS, Octal Tri-State Buffer, 74HC244
U5	296674-245	I.C., H.S. CMOS, Octal Tri-State Transceiver, 74HC245
U6	296674-154	I.C., H.S. CMOS, 4-16 Line Decoder, 74HC154
U7	CL-611886-00	I.C., Programmed EPROM, 32K x 8
U8	296791-3	I.C., CMOS, Static RAM, 8K x 8, HM6264LP-15
U9	CL-210010	I.C., CMOS, ACIA, 65C51-1
U10	296791-3	I.C., CMOS, Static RAM, 8K x 8, HM6264LP-15
U11	296674-373	I.C., H.S. CMOS, Octal Tri-State Latch, 74HC373
U12	296674-151	I.C., H.S. CMOS, 8-Ch. Digital Multiplexer, 74HC151
U13	296674-30	I.C., H.S. CMOS, 8 Input NAND Gate, 74HC30
U14-U16	296674-244	I.C., H.S. CMOS, Octal Tri-State Buffer, 74HC244
U17	296674-646	I.C., H.S. CMOS, Octal Bus Transceiver/ Register, 74HC646
U18	296674-74	I.C., H.S. CMOS, Dual D Flip-Flop, 74HC74
U19	296674-30	I.C., H.S. CMOS, 8 Input NAND Gate, 74HC30
U20	296674-126	I.C., H.S. CMOS, Quad Tri-State Buffer, 74HC126
U21-U23	296674-04	I.C., H.S. CMOS, Hex Inverter, 74HC04
U24-U26	296674-00	I.C., H.S. CMOS, Quad NAND Gate, 74HC00
XU1	288487-24	I.C. Socket, 24 Pin
XU2	288487-28	I.C. Socket, 28 Pin
Y1	289053-14	Crystal, 1.8432 Meg Hz

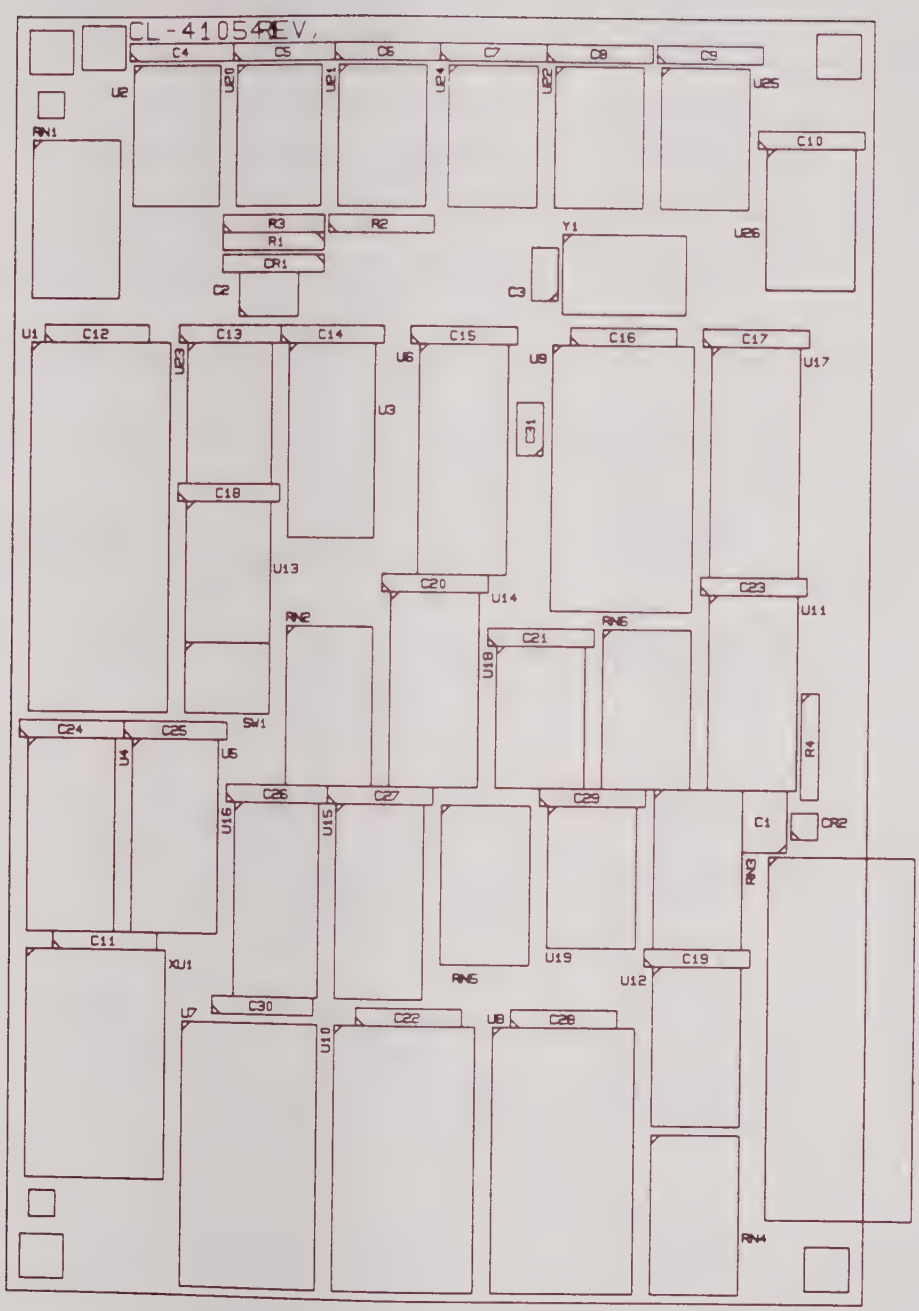


FIGURE 4-43 INTERPRETER BD.

PC BOARD ASSY., RS 3200 MOTHER, SIGNAL CONDITIONER CAGE CL-811619
FIGURE 4-44

DESIGNATION	PART NUMBER	DESCRIPTION
CR1-CR2	269256-7	Diode, 1A, 1N4007
J1-J10	Not Used	
J11,J12	CL-210434-8	Connector, Cardedge, 8 Contacts (A-P)
	31-119918-4008	Screw, Pan Hd.,4-40 x 1/2 In.
	1-123253-802	Spacer, Riveted, Threaded, 4-40 x 5/8 In.
		----- * -----
J13-J20	Not Used	
J21,J22	CL-210209-48	Connector, DIN, Female, 48 Contacts (A-P)
	31-119918-2605	Screw, Pan Hd., 2-56 x 5/16 In.
	31-119998-26	Nut, Hex, #2-56
		----- * -----
P1-P30	Not Used	
P31	1-292529-40	Connector, Rt. Angle, Dbl Row, Male, 40 Pin (A-P)
	31-119918-2607	Screw, Pan Hd., 2-56 x 7/16 In.
	31-119998-26	Nut, Hex, #2-56
	293337	Key, Polorizing
		----- * -----
P32-P40	Not Used	
P41	CL-210285-48	Connector, Rt. Angle DIN, Male, 48 Contacts (A-P)
	31-119918-2607	Screw, Pan Hd., 2-56 x 7/16 In.
	31-119998-26	Nut, Hex, #2-56
		----- * -----
P42-P50	Not Used	
P51	1-292529-26	Connector, Rt. Angle, Dbl Row, Male, 26 Pin (A-P)
	31-119918-2607	Screw, Pan Hd., 2-56 x 7/16 In.
	31-119998-26	Nut, Hex, #2-56
	293337	Key, Polorizing
		----- * -----
P52-P60	Not Used	
P61	294310-2	Connector, Rt. Angle, Male, 2 Pin

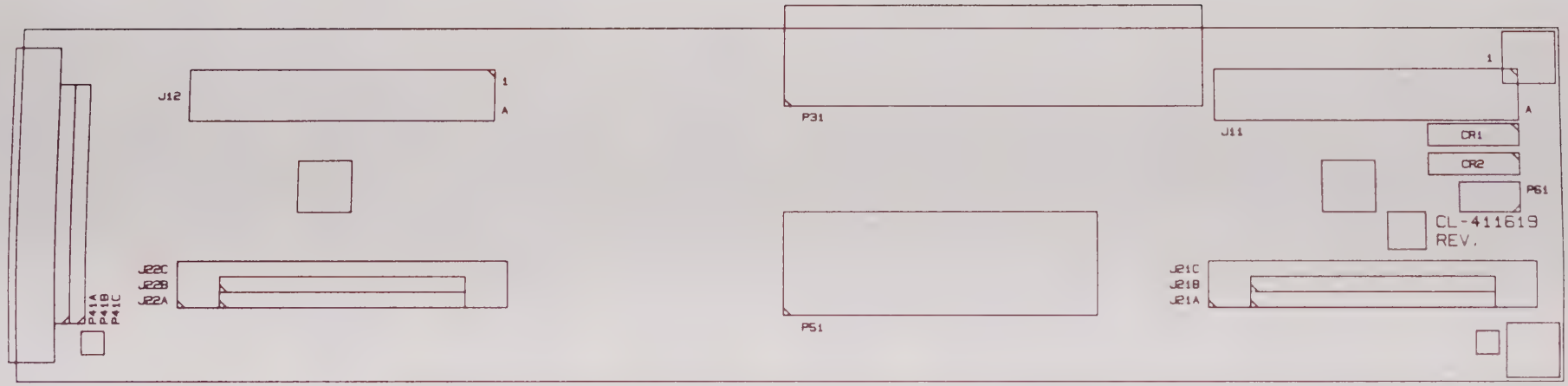


FIGURE 4-44 RS 3200 MOTHER BD. SIGNAL CONDITIONER CAGE

DESIGNATION	PART NUMBER	DESCRIPTION
CR1,CR2	269256-7	Diode, 1A, 1N4007
J1-J10	Not Used	
J11-J14	CL-210434-8	Connector, Cardedge, 8 Contacts (A-P)
	31-119918-4008	Screw, Pan Hd., 4-40 x 1/2 In.
	1-123253-802	Spacer, Riveted, Threaded, 4-40 x 5/8 In.
		----- * -----
J15-J20	Not Used	
J21-J24	CL-210209-48	Connector, DIN, Female, 48 Contacts (A-P)
	31-119918-2605	Screw, Pan Hd., 2-56 x 5/16 In.
	31-119998-26	Nut, Hex, #2-56
		----- * -----
P1-P30	Not Used	
P31	1-292529-40	Connector, Rt. Angle, Dbl, Male, 40 Pin (A-P)
	31-119918-2607	Screw, Pan Hd., 2-56 x 7/16 In.
	31-119998-26	Nut, Hex, #2-56
		----- * -----
P32-P40	Not Used	
P41	CL-210285-96	Connector, Rt. Angle DIN, Male, 96 Contacts (A-P)
	31-119918-2607	Screw, Pan Hd., 2-56 x 7/16 In.
	31-119998-26	Nut, Hex, #2-56
		----- * -----
P42-P50	Not Used	
P51	1-292529-26	Connector, Rt. Angle, Dbl Row, Male, 26 Pin (A-P)
	31-119918-2607	Screw, Pan Hd., 2-56 x 7/16 In.
	31-119998-26	Nut, #2-56
	293337	Key, Polorizing
		----- * -----
P52-P60	Not Used	
P61	294310-2	Connector, Rt. Angle, Male, 2 Pin

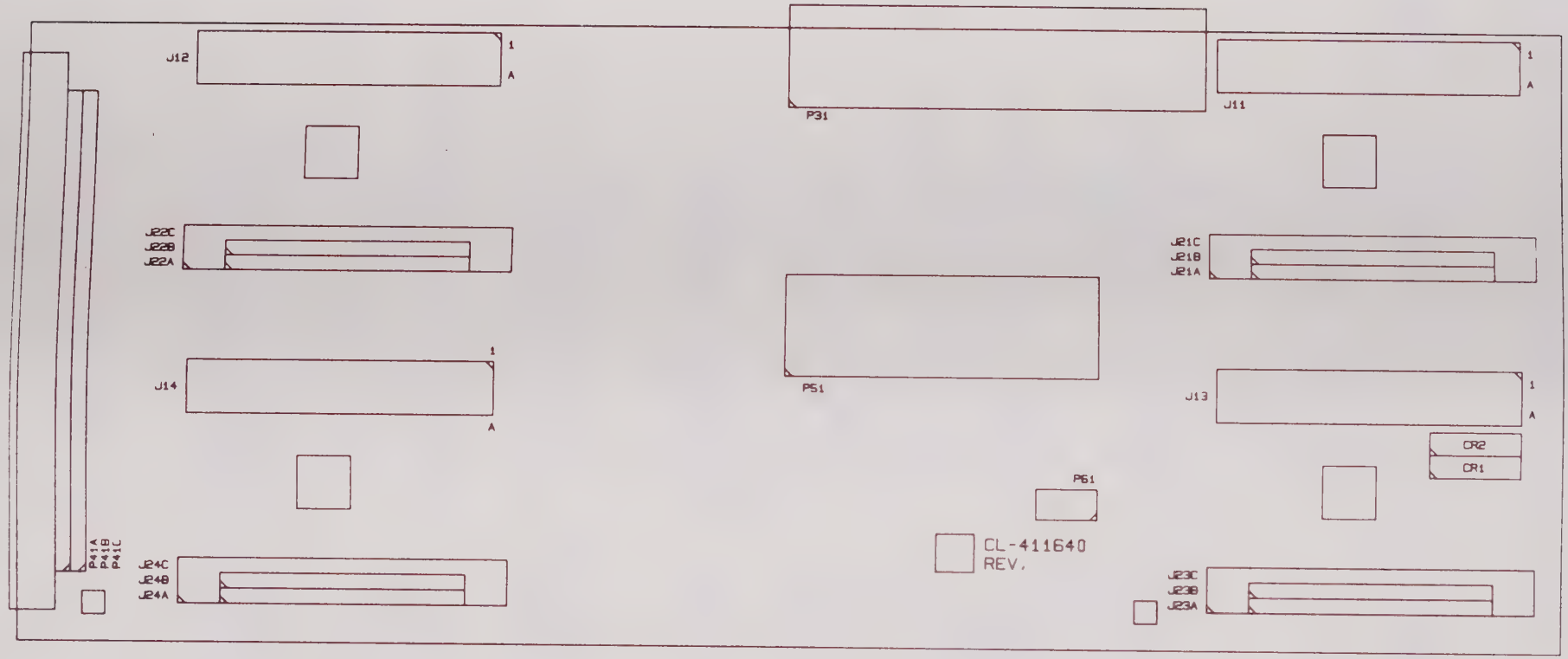


FIGURE 4-45 RS 3400 MOTHER BD. SIGNAL CONDITIONER CAGE

DESIGNATION	PART NUMBER	DESCRIPTION
B1	CL-210118	Battery, AA Cell, 3.5V, Lithium Thionyl Chloride, NON-Rechargeable (A-P)
	232997-23	Tie Wrap, 3.5 In.
		----- * -----
BH1	CL-210206	Battery Holder
C1-C9	Not Used	
C10-C12	283943-106	Capacitor, Tantalum, 20WVDC, 20%, 10UF
C13	Not Used	
C14	CL-212603-154	Cap., 275VAC, EMI/RFI Suppression, 0.15UF
CR1-CR8	Not Used	
CR9	269256-7	Diode, 1A, 1N4007
CR10	234003	Diode, Germanium, 100ma, 1N283
EJ1	290306-1	Ejector White (Not Shown)
EJ2	290306-2	Ejector Red (Not Shown)
J1	1-293738-60	Connector, Dual Readout, Male, 60 Contacts
J2	Not Used	
J3	CL-610788	Cable Assy., PSM1 AC Input (A-P)
	232997-23	Retaining Strap, 3.5 In.
		----- * -----
J4,J5	Not Used	
J6	CL-610790	Cable Assy., PSM1 Output
LF	CL-212789-1	Power Line Filter (A-P)
	CL-612794	Line Filter Output Cable Assy.
	31-119918-6207	Screw, Machine, Pan Hd., 6-32 x 7/16 In.
	1-120052-205	Internal Tooth Lockwasher
	290074-24	Threaded Hex Spacer
	232997-26	Retaining Strap, 11.5 In.
		----- * -----
P1	CL-810466	P.C. Board, Voltage/Select, (Not Shown)
P2-P4	281711-3	Connector, Male, 3 Contact
P5	Not Used	
P6	281711-6	Connector, Male, 6 Contact
PR1	CL-210203	Line Power Recept., On/Off Sw., Fuse Holder (A-P)
	CL-612898-1	Line Filter Wire, Brown, 2.5 In.
	231608-5	Heat Shrink Insulation
	CL-612898-2	Line Filter Wire, Blue, 2.5 In.

DESIGNATION	PART NUMBER	DESCRIPTION
	231608-5	Heat Shrink Insulation
	CL-310215	Bracket
	13-262716-6206	Screw, Machine, Pan Hd., 6-32 x 3/8 In.
	CL-212459-1	Contact Strip
	262565-30	Washer, Flat, #6
	CL-612758-2	Cable Assembly, Grounding Strap, 5.25 In.
	232997-23	Retaining Strap, 3.5 In.
	CL-612758-1	Cable Assembly, Grounding Strap, 3.5 In.
	243898-62	Nut Assembly, #6-32
	13-262716-6206	Screw, Machine, Pan Hd., 6-32 x 3/8 In.
	113182-10	Fuse 10A, 3400, 115V Nominal Line Voltage
	2-297274-19	Fuse 6.3A, 3400, 230V Nominal Line Voltage
	113182-6	Fuse 6A, 3200, 115V Nominal Line Voltage
	2-297274-17	Fuse 4A, 3200, 230V Nominal Line Voltage
		----- * -----
PSM1	CL-210774	Power Supply Module, +5 Volts (A-P)
	31-131131-6203	Screw, Machine, Flat Hd., 6-32 x 3/16 In.
	CL-212753	Shield Plate
	290074-24	Threaded, Brass, Hex Spacer, 6-32 x 1 3/16 In.
	262565-30	Flat Washer, ID 0.144 In., 0.060 In. Thick
	CL-212692-1	Insulator, Bottom
	CL-212692	Insulator, Upper
	31-119918-6207	Screw, Machine, Pan Hd., 6-32 x 7/16
	249438-9	Sleeve, Spacer, 1/8 In.
		----- * -----
R1-R3	Not Used	
R4	CL-210099-1001	Resistor, Metal Film, 1/4W, 1%, 1K
R5-R10	Not Used	
R11	CL-210099-4991	Resistor, Metal Film, 1/4W, 1%, 4.99K
RN1,RN2	Not Used	
RN3	297492	Resistor Network, DIP, 4-10K Resistors
S1	294198-40	Switch, Thermal
TP1,TP2	265763-3	Contact, P.C. Pin, Male
U1	CL-210196	DC/DC Convertor, 5 VDC to 29VDC & 4.4 VAC
U2-U4	Not Used	
U5	296678	I.C., Voltage Reference, -10 volts, LH0070
U6	291062-3	I.C., Quad Operational Amplifier, TL084CN
U7	CL-610991	I.C., Programmed PAL, Divider By 50 Counter
U8	CL-213816	I.C., Quad FET Switch, LF13333N
UX1	285593-20	I.C. Socket, 20 Pin

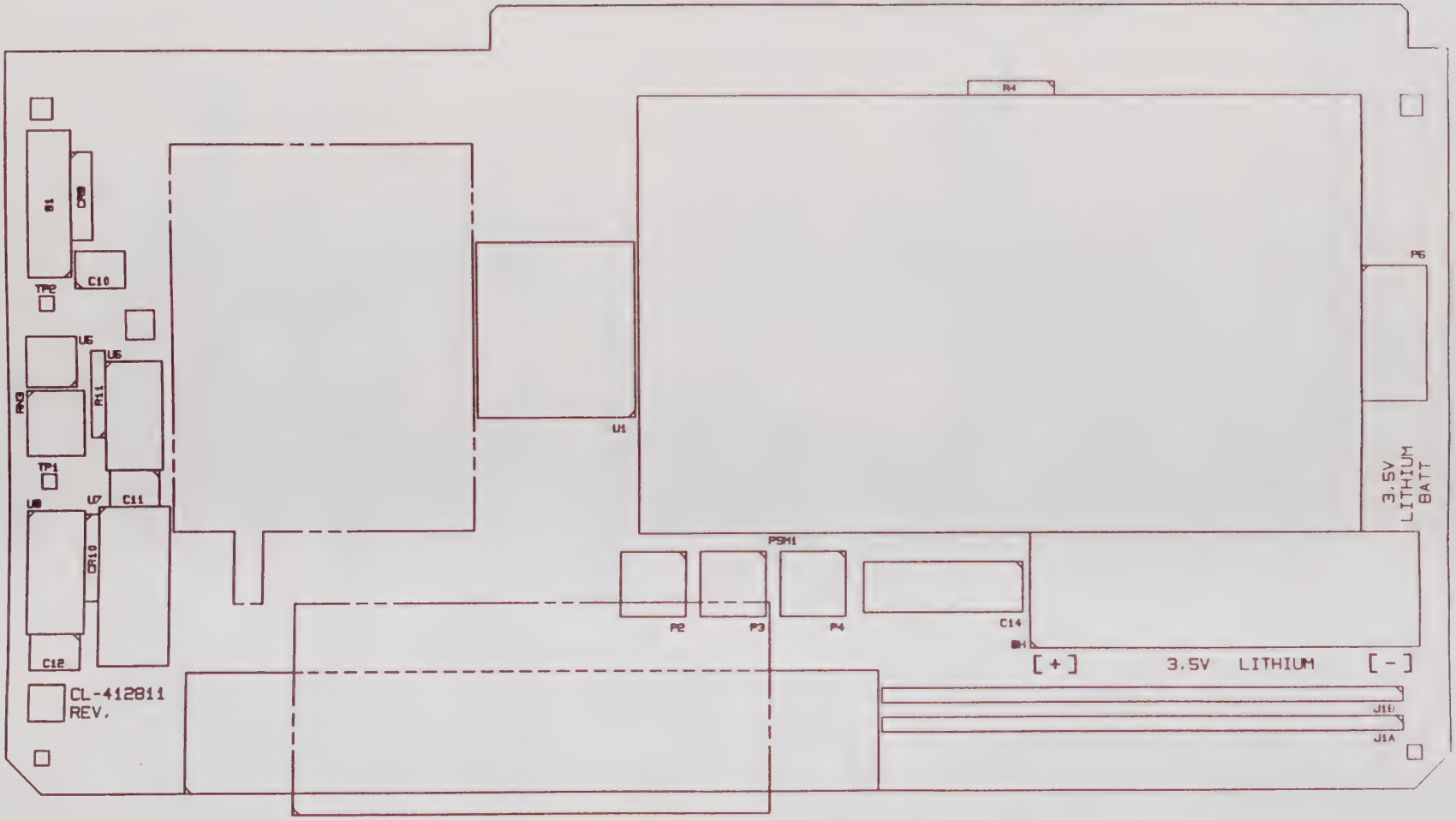


FIGURE **4-46** 5 VOLT POWER SUPPLY BOARD

DESIGNATION	PART NUMBER	DESCRIPTION
	CL-710329	Cable, Assembly
C1-C5	288755-104	Capacitor, Monolithic, 50VDC, 0.1UF
C6	Not Used	
C7-C14	288755-104	Capacitor, Monolithic, 50VDC, 0.1UF
C15	10-263695-105	Capacitor, Tantalum, 20WVDC, 10%, 1UF
C16	283943-156	Capacitor, Tantalum, 20WVDC, 20%, 15UF
C17	295462-685	Capacitor, Lytic, 40WVDC, +50%-10%, 6.8UF
L1	291224-1	Inductor, 10%, 0.25 ohms, 8.2UH
R1	CL-210099-1001	Resistor, Metal Film, 1/4W, 1%, 1K
U1	296674-138	I.C., H.S. CMOS, 3-8 Decoder, 74HC138
U2	CL-210194	I.C., Keyboard/Display Interface, 8279
U3	296674-138	I.C., H.S. CMOS, 3-8 Decoder, 74HC138
U4	296674-32	I.C., H.S. CMOS, Quad OR Gate, 74HC32
U5,U6	Not Used	
U7	CL-210195	I.C., CMOS, 16 Key Encoder, 74C922N
U8	296674-368	I.C., H.S. CMOS, Hex Tri-State Buffer, 74HC368
U9	296674-244	I.C., H.S. CMOS, Octal Tri-State Buffer, 74HC244
U10-U14	CL-210193	I.C., VF Display Driver, 75512
VFD	CL-210199	Vacuum Fluorescent Display, DC164A2

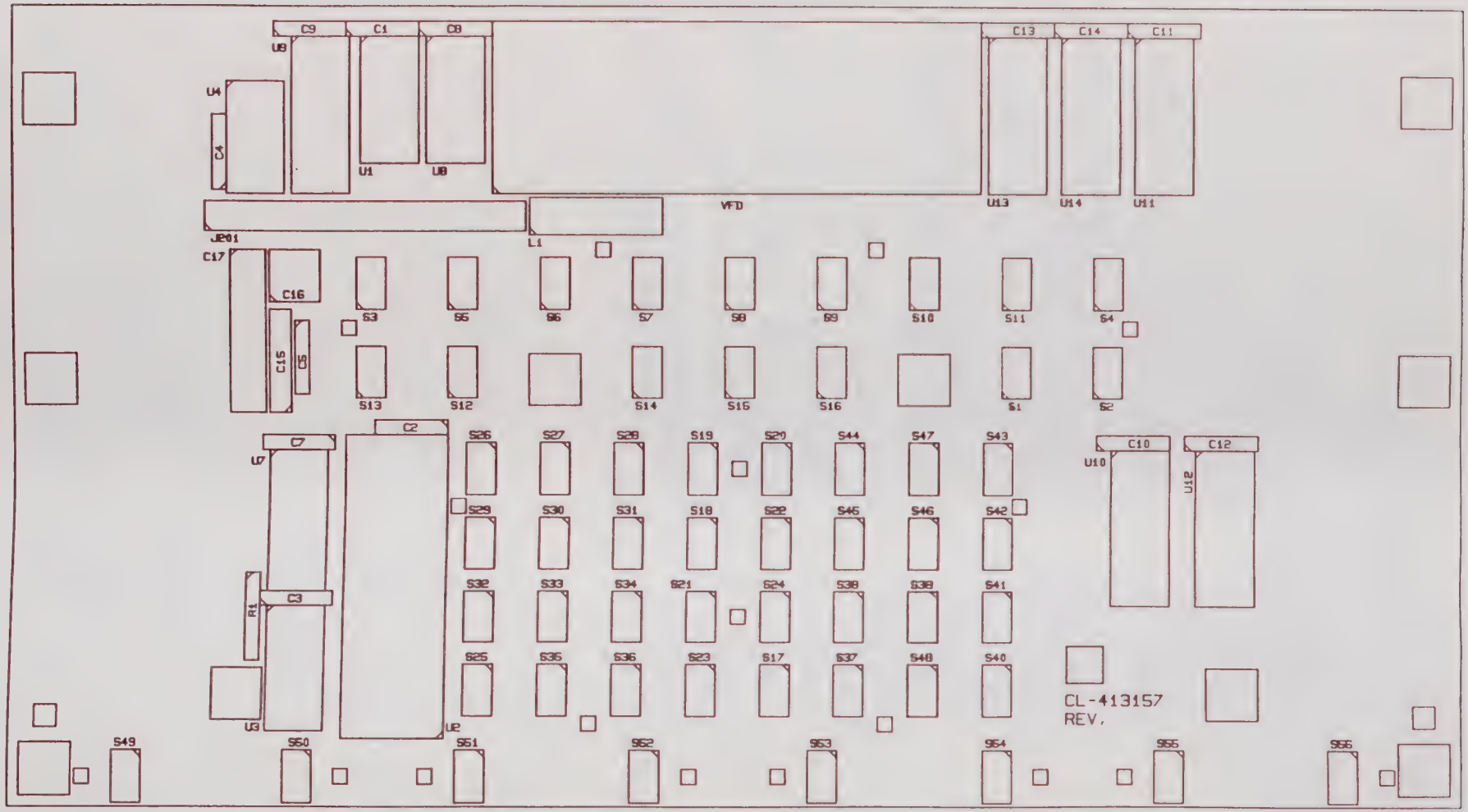


FIGURE 4-47 RS3400 KEYBOARD

RS 3200 & RS 3400
PC BOARD ASSY., RS 3200 KEYBOARD CL-813158-1 & -2
FIGURE 4-48

DESIGNATION	PART NUMBER	DESCRIPTION
	CL-710329	Cable, Assembly
C1-C5	288755-104	Capacitor, Monolithic, 50VDC, 0.1UF
C6	Not Used	
C7-C14	288755-104	Capacitor, Monolithic, 50VDC, 0.1UF
C15	10-263695-105	Capacitor, Tantalum, 20WVDC, 10%, 1UF
C16	283943-156	Capacitor, Tantalum, 20WVDC, 20%, 15UF
C17	295462-685	Capacitor, Lytic, 40WVDC, +50%-10%, 6.8UF
L1	291224-1	Inductor, 10%, 0.25 ohms, 8.2UH
R1	CL-210099-1001	Resistor, Metal Film, 1/4W, 1%, 1K
U1	296674-138	I.C., H.S. CMOS, 3-8 Decoder, 74HC138
U2	CL-210194	I.C., Keyboard/Display Interface, 8279
U3	296674-138	I.C., H.S. CMOS, 3-8 Decoder, 74HC138
U4	296674-32	I.C., H.S. CMOS, Quad OR Gate, 74HC32
U5,U6	Not Used	
U7	CL-210195	I.C., CMOS, 16 Key Encoder, 74C922N
U8	296674-368	I.C., H.S. CMOS, Hex Tri-State Buffer, 74HC368
U9	296674-244	I.C., H.S. CMOS, Octal Tri-State Buffer, 74HC244
U10-U14	CL-210193	I.C., VF Display Driver, 75512
VFD	CL-210199	Vacuum Fluorescent Display, DC164A2

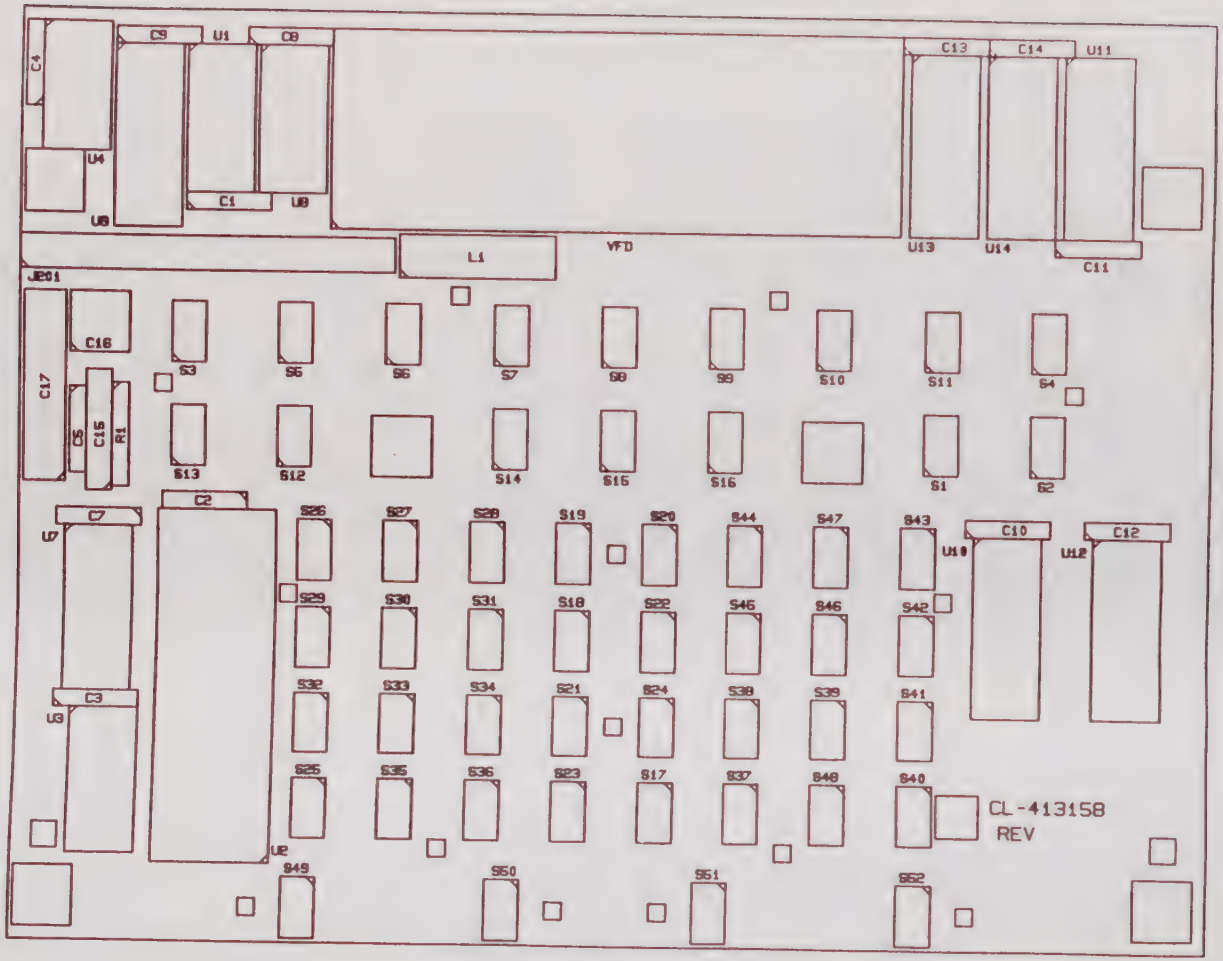
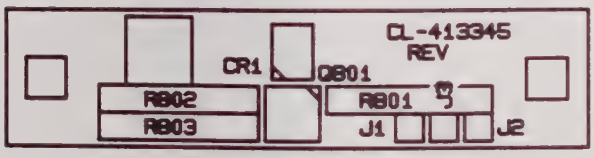


FIGURE 4-48 RS3200 KEYBOARD

RS 3200 & RS 3400
PC BOARD ASSY., SENSOR CL-813345
FIGURE 4-49

DESIGNATION	PART NUMBER	DESCRIPTION
J1,J2	CL-613426	Cable Assy., (A-P)
	290020	Cable, Flat, 3 Connector
	293994-4	Connector, Female, 4 Circuits
	1-287490	Contact, Electrical
		----- * -----
CR1	CL-213351	Photointerrupter, GPISI7
Q801	286141	Transistor, NPN, 2N3904
R801	5-241111-512	Resistor, Carbon Composition, 1/4W, 5%, 5.1K
R802	5-241111-910	Resistor, Carbon Composition, 1/4W, 5%, 91Ω
R803	5-241111-243	Resistor, Carbon Composition, 1/4W, 5%, 24K
	CL-213354	Bracket (A-P)
	31-119918-4004	Screw, Machine, Pan Hd., 4-40 x 1/4 In.
	1-216741-411	Lockwasher, Spring, #4
	31-119998-40	Nut, Hex, #4-40



RS 3400 & RS 3200 THERMAL RECORDER
MOBILE CART
FIGURE 4-50

ITEM NUMBER	PART NUMBER	DESCRIPTION 1 2 3 4 5 6	USED ON
1	11-6405-05	Cart Assy., Mobile	
2	CL-211649	Strap, Buckled	
3	244905	Caster, Swivel	

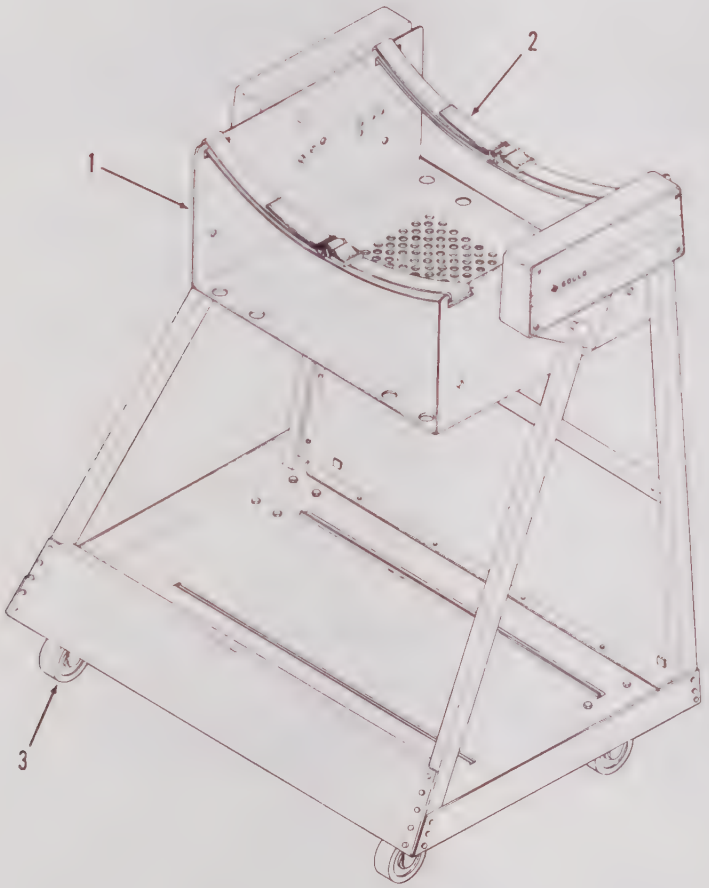


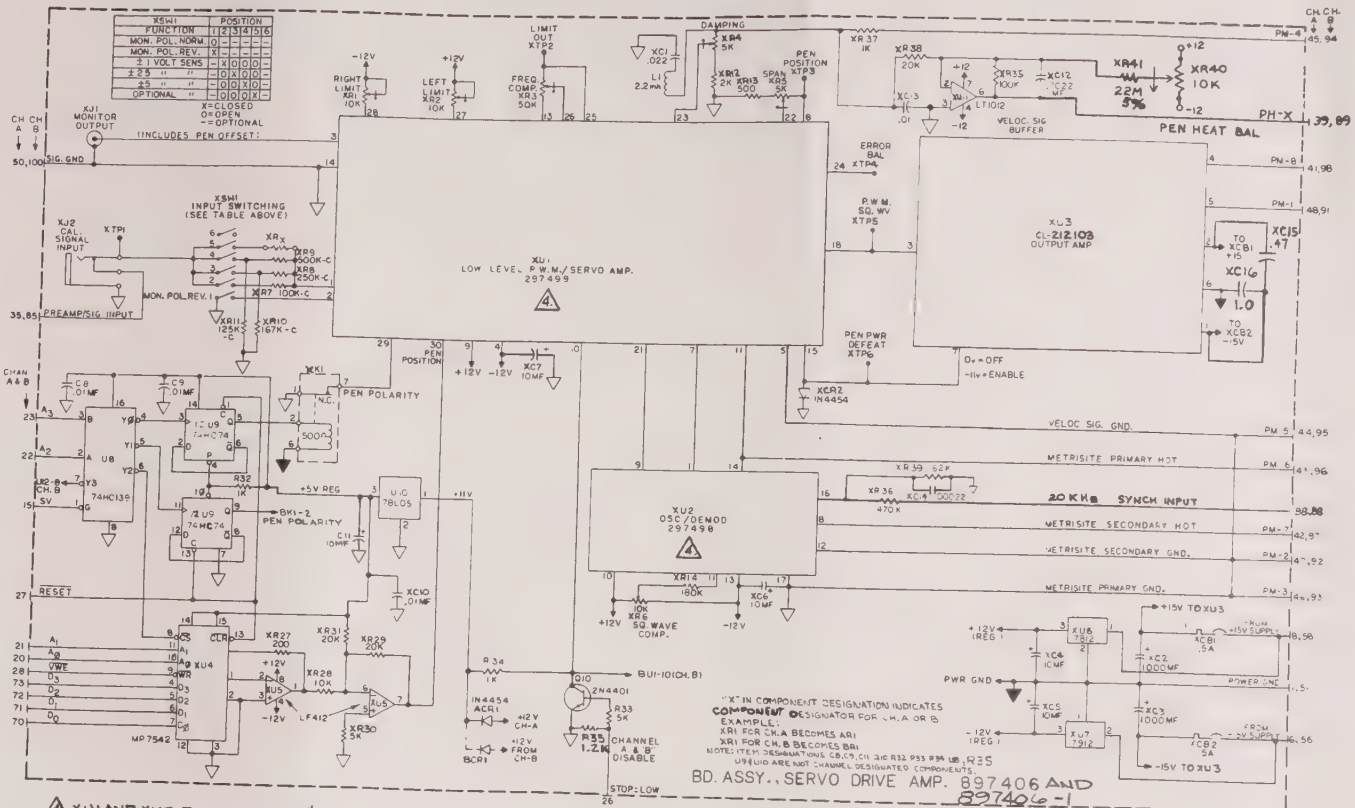
FIGURE 4-44 MOBILE CART

APPENDIX A

SCHEMATIC DIAGRAMS

Listed below are the schematic diagrams which apply to the RS3200 and RS3400 thermal recorders. The schematics follow this page in the order which they are listed. The P.C. board assembly number and the corresponding schematic drawing number have the same six digit base number in common. The P.C. board assembly number begins with an 8 and the schematic drawing number begins with a 2.

Schematic Number	Rev Level	Description
297406	U	Servo Drive Bd.
297498	G	Oscillator/Demodulator Hybrid Ckt.
297499	G	Control Amplifier Hybrid Ckt.
297515	N	5 Volt Power Supply Bd. (30-V8XXX-XX)
297635	F	Chart Supply Sensor Bd.
297636	E	IRIG Interface Bd.
297637	Y	Controller Bd.
297650	K	RS3200 Mother Bd.
297651	J	RS3400 Mother Bd.
297658	F	Chart Drive Bd.
297727	M	IEEE-488 Interface Bd.
297728	P	RS-232C Interface Bd
297809	P	Pen Heat Control Bd.
297811	L	RS3200 Mother-In-Law Bd
297812	P	RS3400 Mother-In-Law Bd.
297843	G	RS3200 Keyboard Bd (30-V82XX-XX)
297844	G	RS3400 Keyboard Bd. (30-V84XX-XX)
297912	A	Photo Sensor Cable Assy..
CL-210191	E	Interchannel Annotation Driver Bd.
CL-210240	H	Paper Out Sensor Bd.
CL-210290	-	Speed Monitor Bd.
CL-210312	F	Standard Interface, (Dummy), Bd.
CL-210380	C	Pen Servo Output Ckt. Bd.
CL-210438	D	RS3400 Interconnect Bd.
CL-210439	D	RS3400 Medical Output Bd.
CL-210461	D	RS3200 Interconnect Bd.
CL-210462	D	RS3200 Medical Output Bd.
CL-210466	D	Voltage Selector Bd.
CL-210541	F	Interpreter Bd.
CL-211348	B	Pen Lead Retainer Bd. (35-V8420-1X only)
CL-211532	B	35-V8412-00 Overall Schematic
CL-211534	B	35-V8420-00 Overall Schematic
CL-211536	B	35-V8404-00 Overall Schematic
CL-211538	B	35-V821-00 Overall Schematic
CL-211540	B	35-V8202-00 Overall Schematic
CL-211619	C	RS3200 Mother Bd., Signal Conditioner Cage
CL-211640	C	RS3400 Mother Bd., Signal Conditioner Cage
CL-212103	-	MOSFET Pen Servo Output Amp.
CL-212811	C	5 Volt Power Supply Bd. (35-V8XXX-XX)
CL-213157	B	RS3400 Keyboard Bd (35-V84XX-XX)
CL-213158	B	RS3200 Keyboard Bd. (35-V82XX-XX)
CL-213345	-	Sensor Bd
384919	J	Power Kit
393130	H	Power Kit



REVISIONS			
SYM	DESCRIPTION		DATE
H	ORIGINAL RELEASE DCN 33598	SWARTZ	11-4-86
J	NOT EFFECTED DCN 33643	CZECH	1-22-87
K	NOT AFFECTED DCN 34002	CLARK	3-27-87
L	ADDED R35, 1.2K PER DCN 35008	CLARK	6-2-88
M	NOT AFFECTED PER DCN 35173	KISNER	8-30-88
N	REV'D PER DCN 35302	RIVERA	10-10-88
P	ADDED "-1" ASSY NOS & NOTE 4 PER DCN 35354.	KISNER	12-7-88
R	NOT AFFECTED PER DCN 35376.	KISNER	12-9-88
S	NOT AFFECTED PER DCN 35492	CLARK	3-17-89
T	NOT AFFECTED PER DCN 35590	CLARK	6-5-89
U	ADDED XC15, & XC16 PER DCN 35813	CLARK	11-8-89

4. XU1 AND XU2 PART NOS HAVE "-1" SUFFIX ON 897406-1 ASSY.

3. CONNECTIONS PM-1 THRU PM-8 REFER TO PEN MOTOR TERMINALS 1 THRU 8.

2. UNLESS OTHERWISE INDICATED:
ALL CAPACITANCE IN MICROFRADS
ALL RESISTANCE IN OHMS.
ALL RESISTORS 1/4 W, 1%
TOLERANCE C = .25%

1. SIG. GND. ▽ IS TIED TO PWR GND ▼ VIA BACKPLANE CONNECTOR PINS 1, 50, 51 & 100
NOTES:

4.

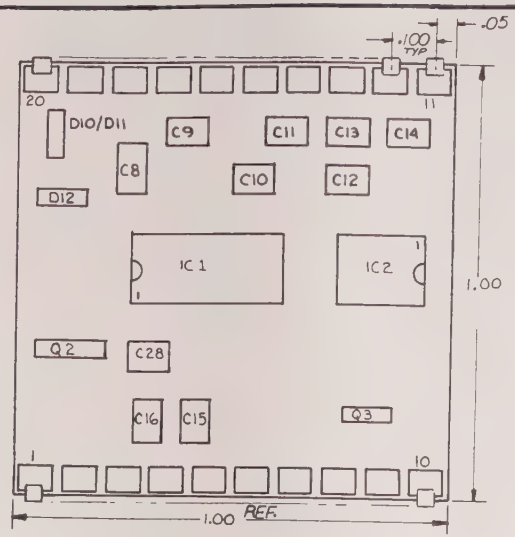
POWER / GROUND PIN CHART							
I.C.	+5V	GND	+15V	-5V	+12V	-12V	SYMBOL
297499		14, 5			9	4	XU1
297498		14, 12			10	13	XU2
CL-212103		6	2	1			XU3
MP7542	14	12					XU4
LF412				8	4		XU5
74HC139	16	8					U8
74HC74	14	7					U9
LT1012					7	4	XU11
7812		2	1				U6
7912		1		2			U7

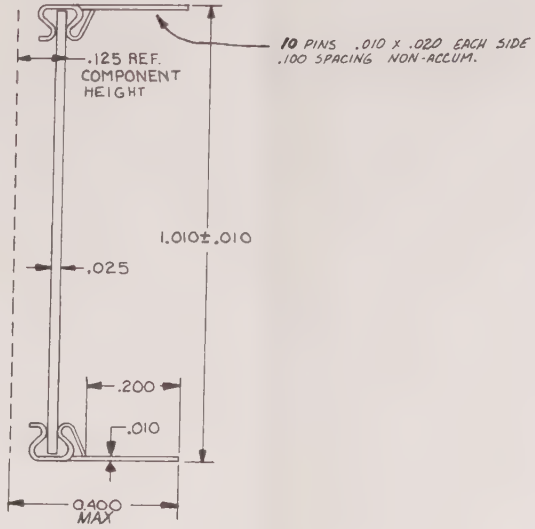
BOARD ASSY., SERVO DRIVE AMP. 897406 & 897406-1

BY	DATE	NAME
BRENEMAN	9/86	SCHEMATIC
CM Swartz	11/86	
	11/88	

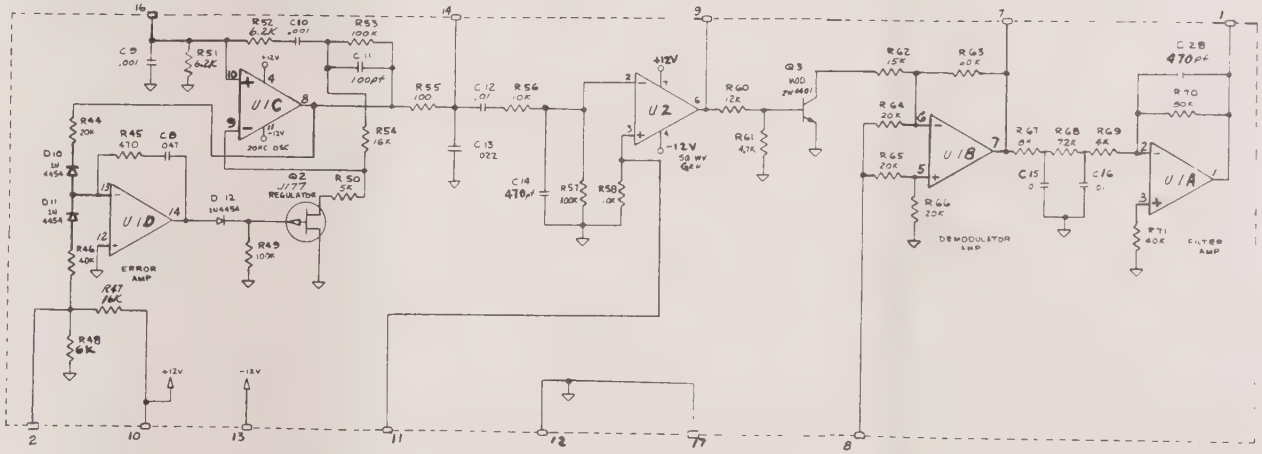
Gould Inc
Instruments Division
Cleveland, Ohio 44114 U.S.A.

CODE IDENT 96795 | SIZE CODE G | DWG. NO 297406





REVISIONS		
SYM.	DESCRIPTION	APPROVAL
A-1	REV D DIAGRAM PER DCN 32404 RIVERA	10-16-85
B	REVISED PER DCN 33926 CLARK	2-20-87
C	REVISED NOTE 6 TO ADD SPECS. DCN 34557 SWARTZ	10-8-87
D	REVISED PER DCN 34705 SWARTZ	11-30-87
E	REVISED PER DCN 35088/A SOTEROS	6-13-88
F	REV'D PER DCN 35303/W. TIDWELL	10-7-88
G	REV'D PER DCN 36046 CZECH	7-31-90



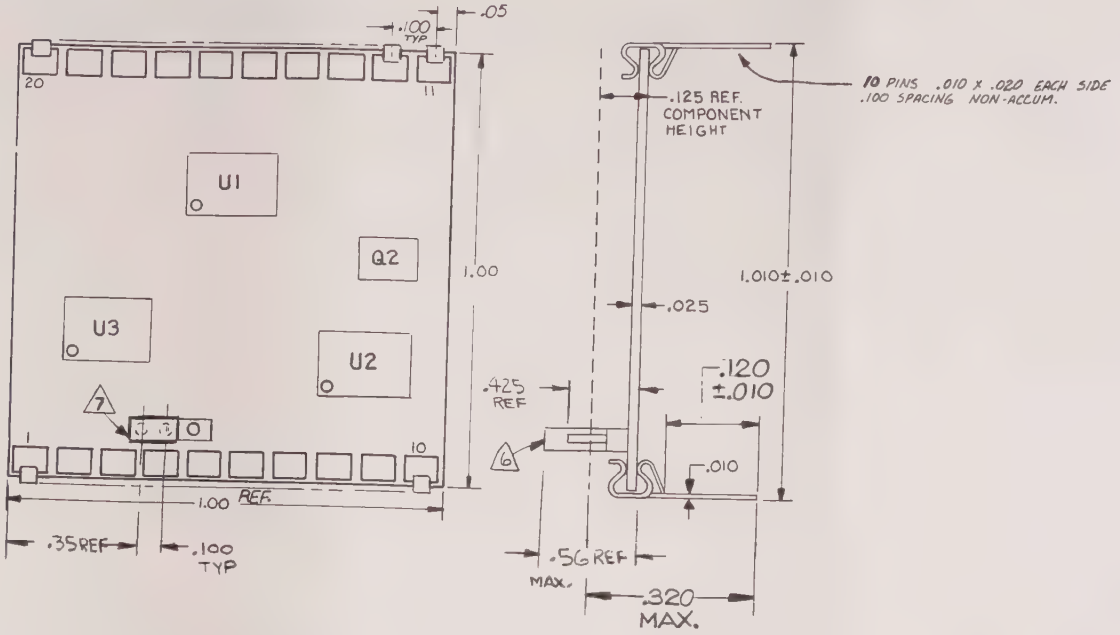
7. THIS ASSEMBLY TO BE BURNED IN AND TESTED BY SUPPLIER.
6. TEST SPEC: USE ID-297498 OR MIL-297498
5. PIN-OUT AND DIMENSIONS ARE FIXED.
4. ALTERNATE COMPONENTS MUST BE APPROVED BY GOULD ENGINEERING.
3. OP-AMPS TO BE TL084ACD SERIES OR TL074CN SERIES
2. ALL CAPACITORS 10% X7R (C9 & C10 5% NPO)
1. RESISTORS ARE 1% TOL., 0.1 WATT TYP.

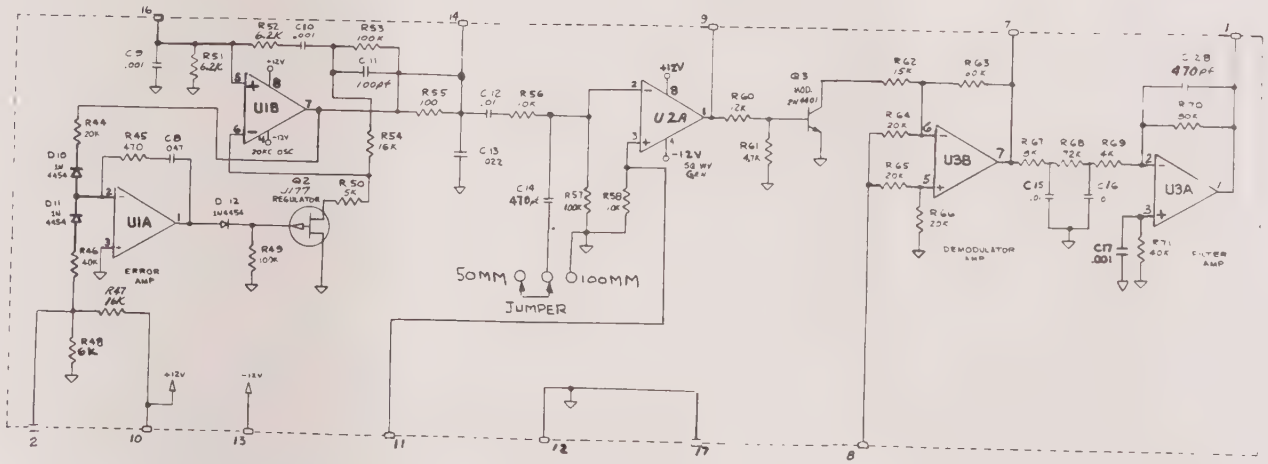
NOTES:

COMM CLASS	PROPRIETARY
UNLESS OTHERWISE INDICATED, MANUFACTURER'S DIMENSIONAL TOLERANCES APPLY.	
NAME	HYBRID CIRCUIT, OSCILLATOR/DEMODULATOR
BY / DATE	Gould Inc. Instruments Division Cleveland Ohio 44114 U S A
DR ZAFFARANO/RIVERA 5-28-85	
CH H. Swartz 6-8-85	DWG. NO. 297498
APP A. Zaffarano	ISSUE CODE R — SHEET 1 OF 2

297498

FORM 2.3





REVISIONS		
SYM.	DESCRIPTION	APPROVAL

7 JUMPER SHOWN IN 50MM PENMOTOR POSITION

6 JUMPER [illegible]

5. PIN-OUT AND DIMENSIONS ARE FIXED.
4. ALTERNATE COMPONENTS MUST BE APPROVED BY GOULD ENGINEERING.
3. OP-AMPS TO BE TL072A SERIES.
2. ALL CAPACITORS 10% X7R (C9 & C10 5% NPO)
1. RESISTORS ARE 1% TOL., 0.1 WATT TYP.

NOTES:

COMM CLASS	PROPRIETARY

UNLESS OTHERWISE INDICATED, MANUFACTURER'S DIMENSIONAL TOLERANCES APPLY.

NAME HYBRID CIRCUIT, OSCILLATOR/DEMODULATOR

BY	DATE
DR A. SOTEROS	6-10-88
CH	
APP	

Gould Inc.
Instruments Division
Cleveland, Ohio 44114 U.S.A.

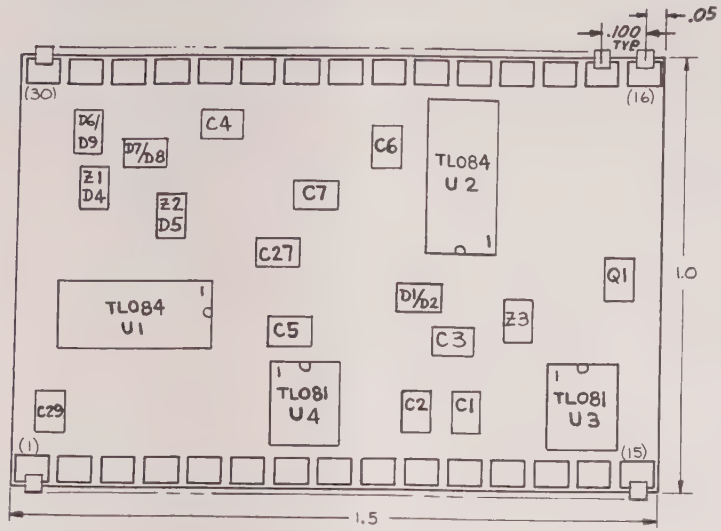
DWG NO. 297498

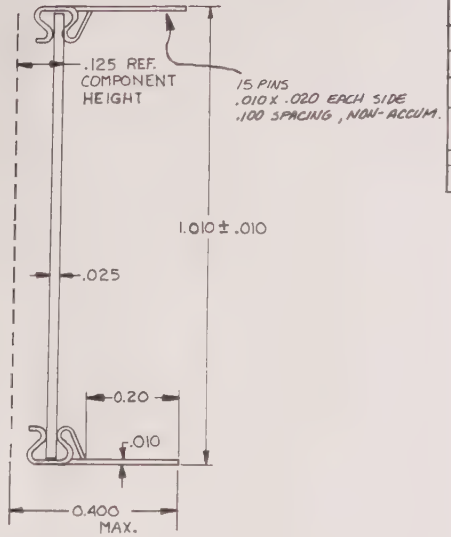
ISSUE CODE R

SHEET 2 OF 2

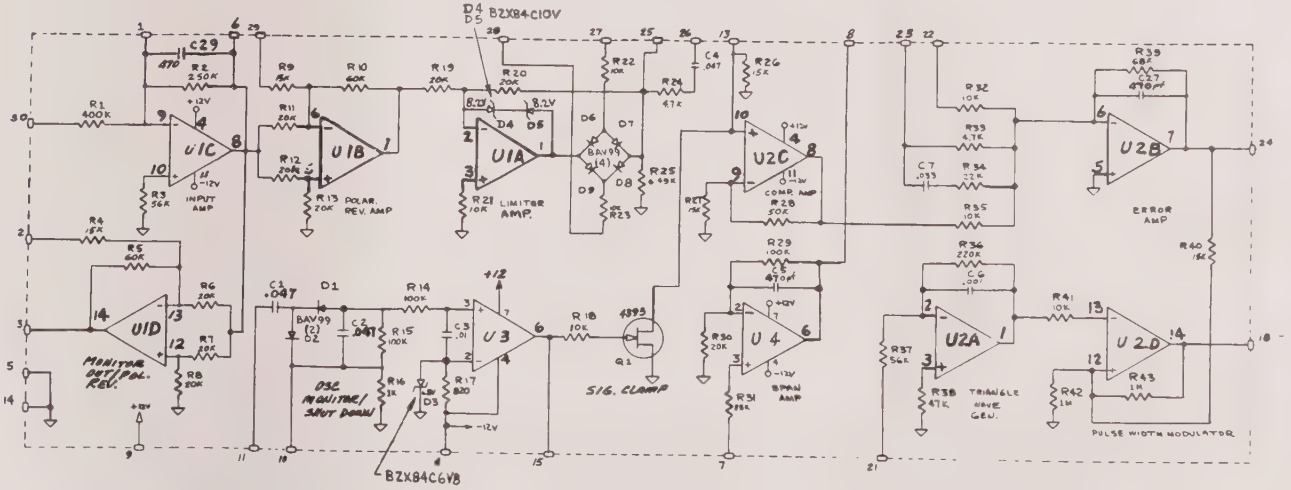
297498

FORM 2.3





REVISIONS		
SYM.	DESCRIPTION	APPROVAL
A	D4 & D5 WERE IN6000B DCN33676	12-2-86 SWARTZ
B	REVISED PER DCN 33890 SWARTZ	3-3-87
C	REVISED PER DCN 33925 SWARTZ	5-12-87
D	CORRECTED COMPONENT LAYOUT DCN 34289 SWARTZ	6-11-87
E	REVISED NOTE-6 TO ADD SPECS. DCN 34556 SWARTZ	10-8-87
F	REVISED PER DCN 35089/A SOTEROS	6-13-88
G	REVD PER DCN 35304/W TIDWELL	10-7-88



7. THIS ASSEMBLY TO BE BURNED-IN AND TESTED BY SUPPLIER.
6. TEST SPEC: USE IS-297499 OR MICL-297498.
5. PIN-OUT AND DIMENSIONS ARE FIXED.
4. ALTERNATE COMPONENTS MUST BE APPROVED BY GOULD ENGINEERING.
3. OP-AMPS TO BE TL084ACD SERIES OR TL074CN SERIES
2. ALL CAPACITORS ARE 10% TOL. 0.1 WATT TYP.
1. RESISTORS ARE 1% TOL., 0.1 WATT TYP.

NOTES: R9-R13 ARE ± 0.5% TOLERANCE.

COMM CLASS: **PROPRIETARY**

UNLESS OTHERWISE INDICATED, MANUFACTURER'S DIMENSIONAL TOLERANCES APPLY.

NAME: HYBRID CIRCUIT, CONTROL AMP.

BY	DATE
DR ZAFFARANO/ RIVERA	5-28-85
CH H. Swartz	6-8-85
APP [illegible]	6-12-85

Gould Inc.
Instruments Division
Cleveland, Ohio 44114 U.S.A

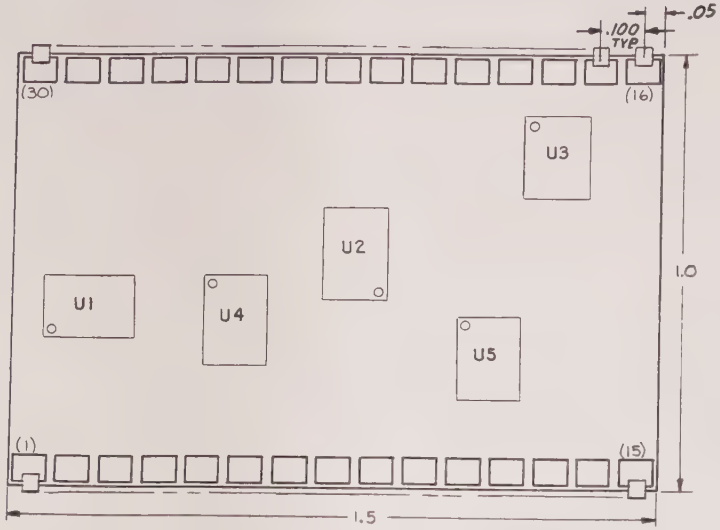
DWG NO 297499

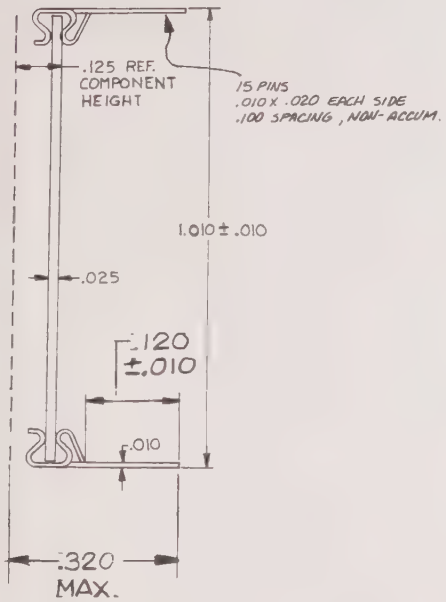
ISSUE CODE R | SHEET 1 OF 2

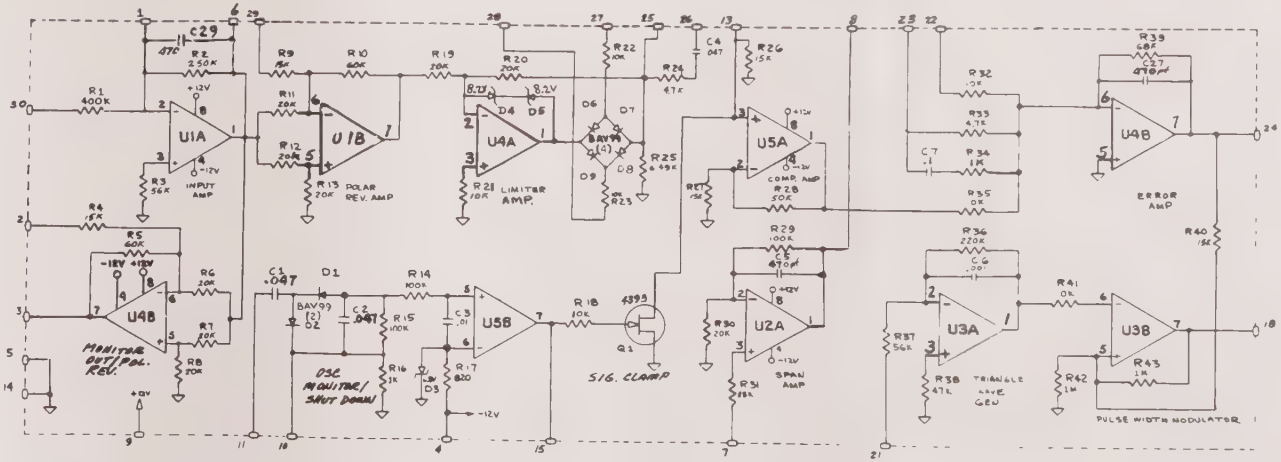
FORM 2.3

297499

REVISIONS		
SYM.	DESCRIPTION	APPROVAL







NOTES:
1. RESISTORS ARE 1% TOL., 0.1 WATT TYP. R9-R13 ARE ± 0.5% TOLERANCE.
2. ALL CAPACITORS ARE 10% TOL.
3. OP-AMPS TO BE TL072A SERIES.
4. ALTERNATE COMPONENTS MUST BE APPROVED BY GOULD ENGINEERING.
5. PIN-OUT AND DIMENSIONS ARE FIXED.

COMM CLASS: **PROPRIETARY**

UNLESS OTHERWISE INDICATED, MANUFACTURER'S DIMENSIONAL TOLERANCES APPLY.

NAME: HYBRID CIRCUIT, CONTROL AMP.

BY	DATE
DR A. SOTEROS	6-10-88
CH	
APP	

Gould Inc.
Instruments Division
Cleveland Ohio 44114 U.S.A.

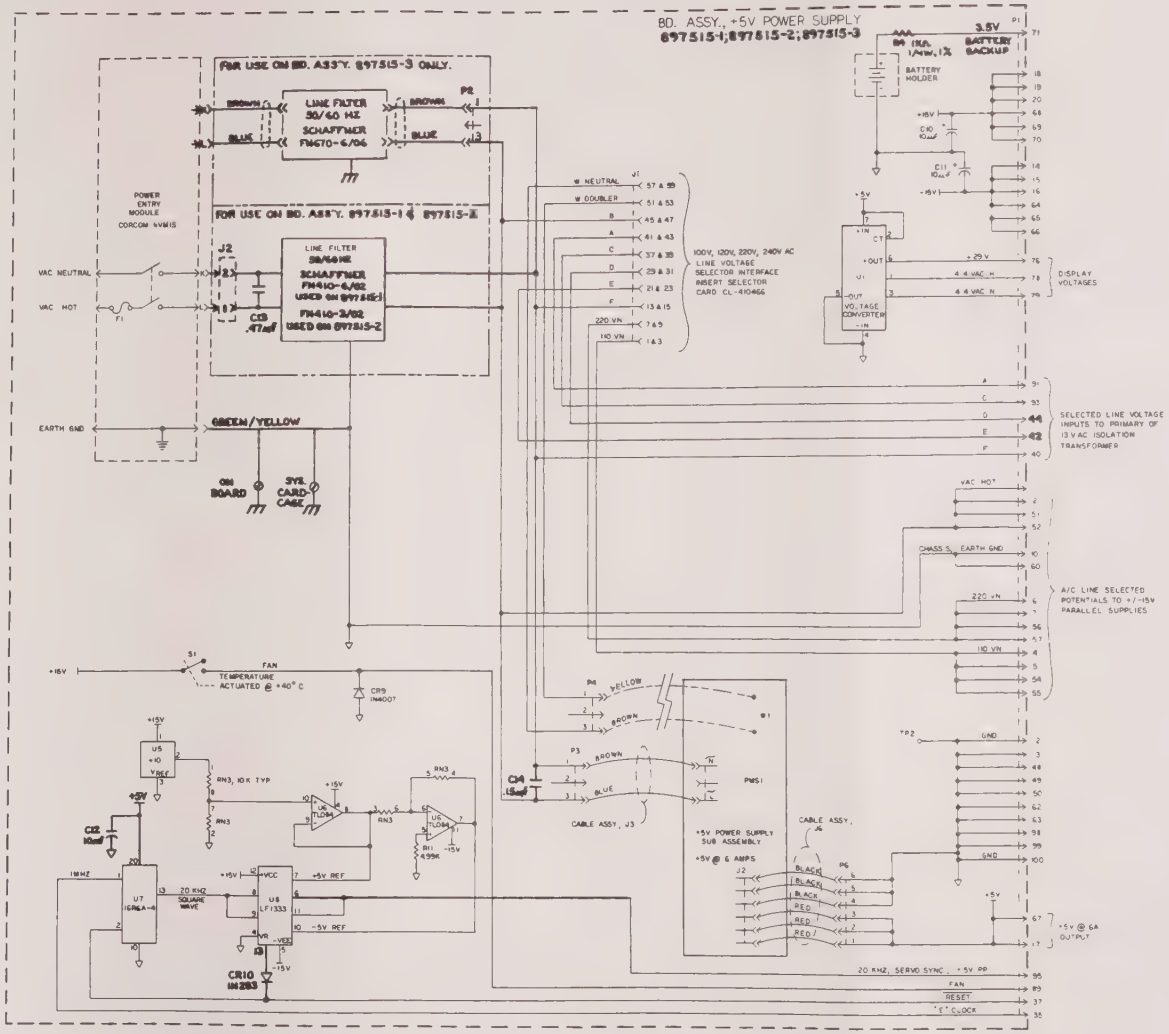
DWG NO. 297499

ISSUE CODE R

SHEET 2 OF 2

297499

FORM 2.3



REVISIONS			
SYM.	DESCRIPTION		DATE
E	ORIGINAL RELEASE DCN 33729 SUARTZ		12/13 86
F	NOT AFFECTED PER DCN 33803	CLARK	1-20-87
G	NOT AFFECTED PER DCN 33973	CLARK	2-5-87
H	NOT AFFECTED PER DCN 33924/A	SOTEROS	4-30-87
J-1	NOT AFFECTED PER DCN 34267/A	SOTEROS	6-9-87
K	ADDED CR10/DCN 35036/A.S.		9-22-88
L	ADDED R4 PER DCN 35277/A.S.		9-22-88
M	REVISED PER DCN 35237/A.S.		9-22-88
N	NOT AFFECTED PER DCN 35529	LK	5-22-89

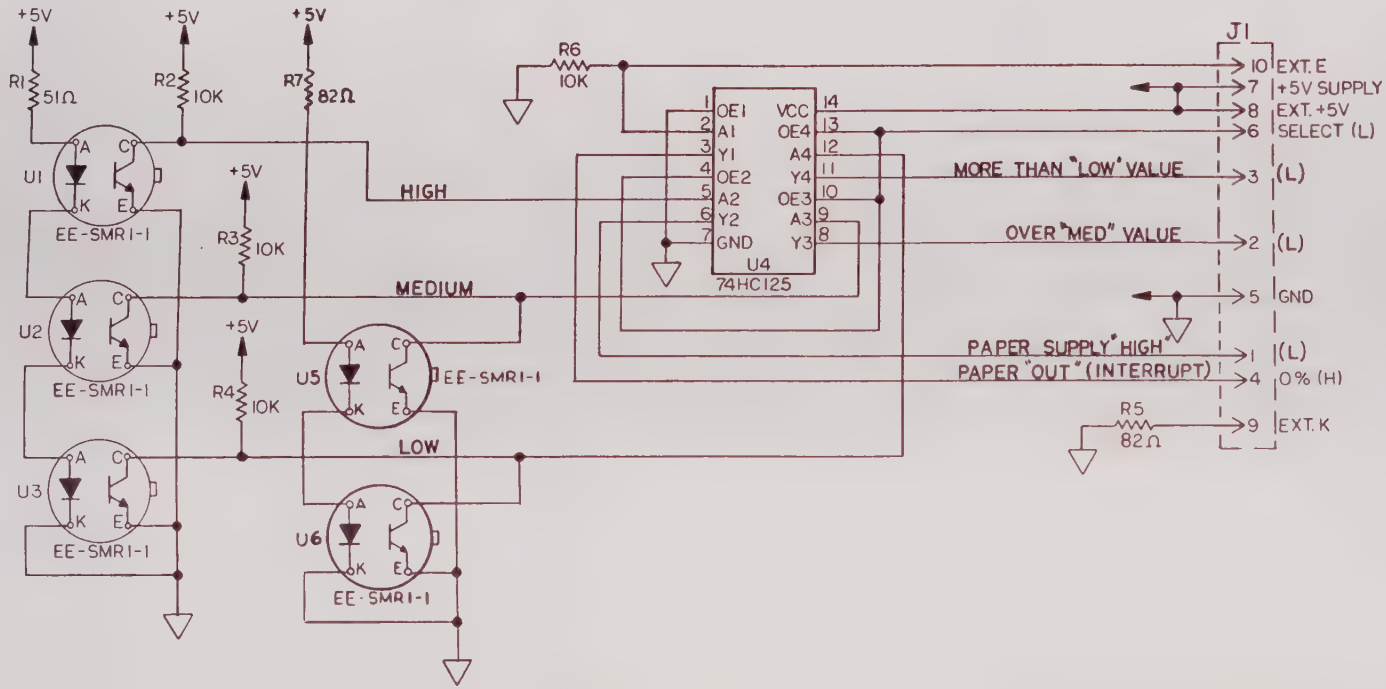
297515

BOARD ASS'Y, 5V POWER SUPPLY 897515-3 897515-2 897515-1

BY	DATE	NAME	
DR		SCHEMATIC	Gould Inc. Instruments Division Cleveland, Ohio 44114 U.S.A.
		CODE IDENT 96795	DWG. NO. 297515
		ISSUE CODE G	

REVISIONS			
BY	DESCRIPTION	DATE	
D	ORIGINAL RELEASE DCN 33612 SWARTZ	11-12-86	
E	REVISED PER DCN 33961 CLARK	3-12-87	
F	NOT AFFECTED PER DCN 34993 CLARK	4-19-88	

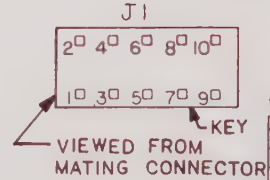
CHART SUPPLY SENSOR BOARD 897635



2.) SENSOR SYMBOLS ARE LEAD END VIEWS

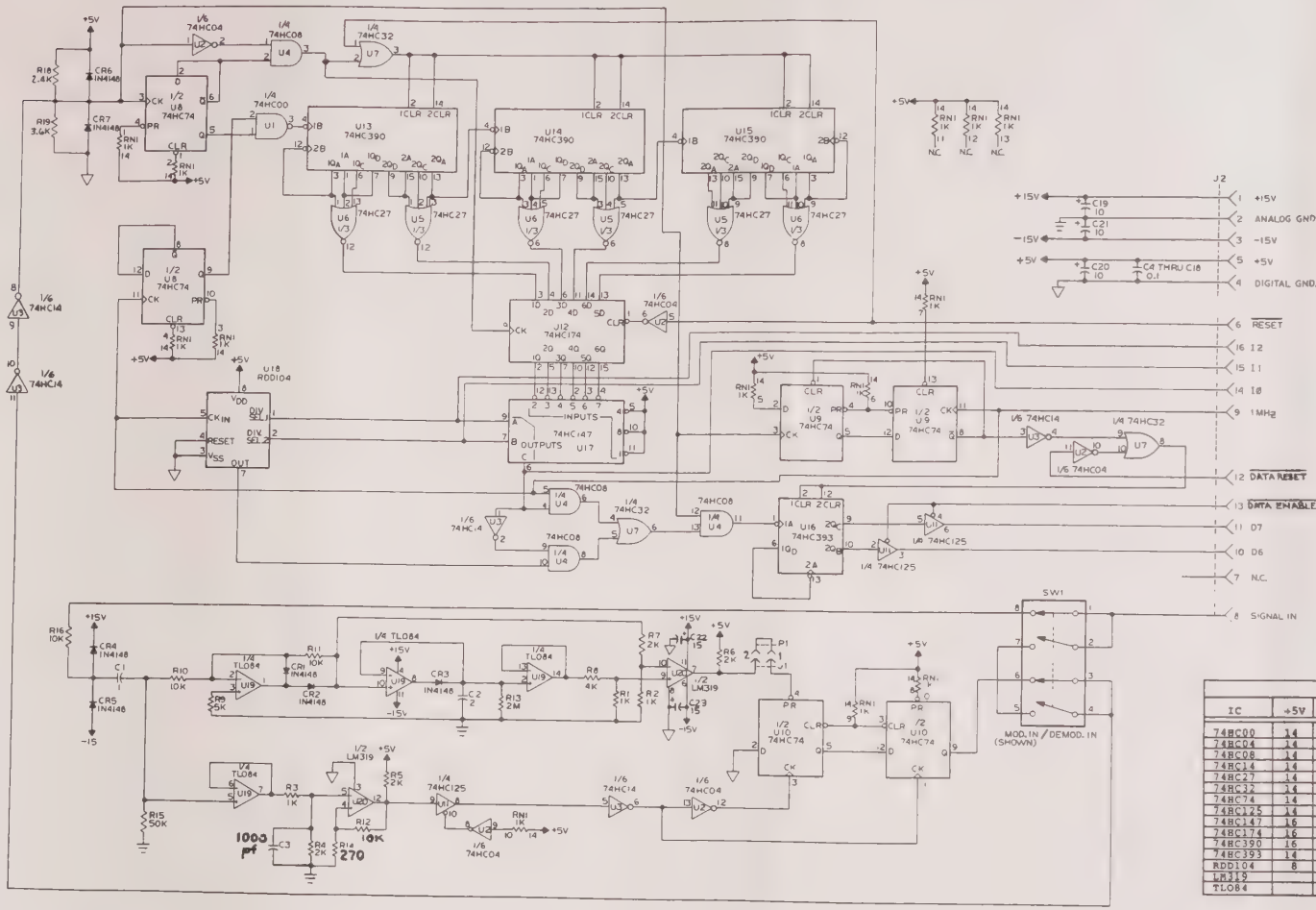
1.) (L) OR (H) = CONDITION "TRUE" FOR LOW (L) OR HIGH (H) TTL LEVEL AT INDICATED TERMINAL.

NOTES:



BOARD ASS'Y, CHART SUPPLY SENSOR 897635

DR J. Kochis	9-86	SCHEMATIC	Gould Inc. Instruments Division Cleveland, Ohio 44114 U.S.A.
CHK swartz	11-86		
APP L. Pratt	11/86	CODE IDENT 96795 ISSUE CODE G	DWG NO 297635



POWER/GROUND PIN CHART					
IC	+5V	DIGITAL GND	+15V	-15V	SYMBOL
74HC00	14	7			U1
74HC04	14	7			U2
74HC08	14	7			U4
74HC14	14	7			U3
74HC27	14	7			U5,6
74HC32	14	7			U7
74HC74	14	7			U8,9,10
74HC125	14	7			U11
74HC147	16	8			U17
74HC174	16	8			U12
74HC390	16	8			U13,14,15
74HC393	14	7			U16
RDD104	8	3			U18
LM319			11	6	U20
TLO84			4	11	U19

2. ⏚ = ANALOG GROUND
   ▽ = DIGITAL GROUND
1. UNLESS OTHERWISE INDICATED:
   ALL CAPACITANCE IN MICROFARADS
   ALL RESISTANCE IN OHMS
   ALL RESISTORS 1/4W, 1%

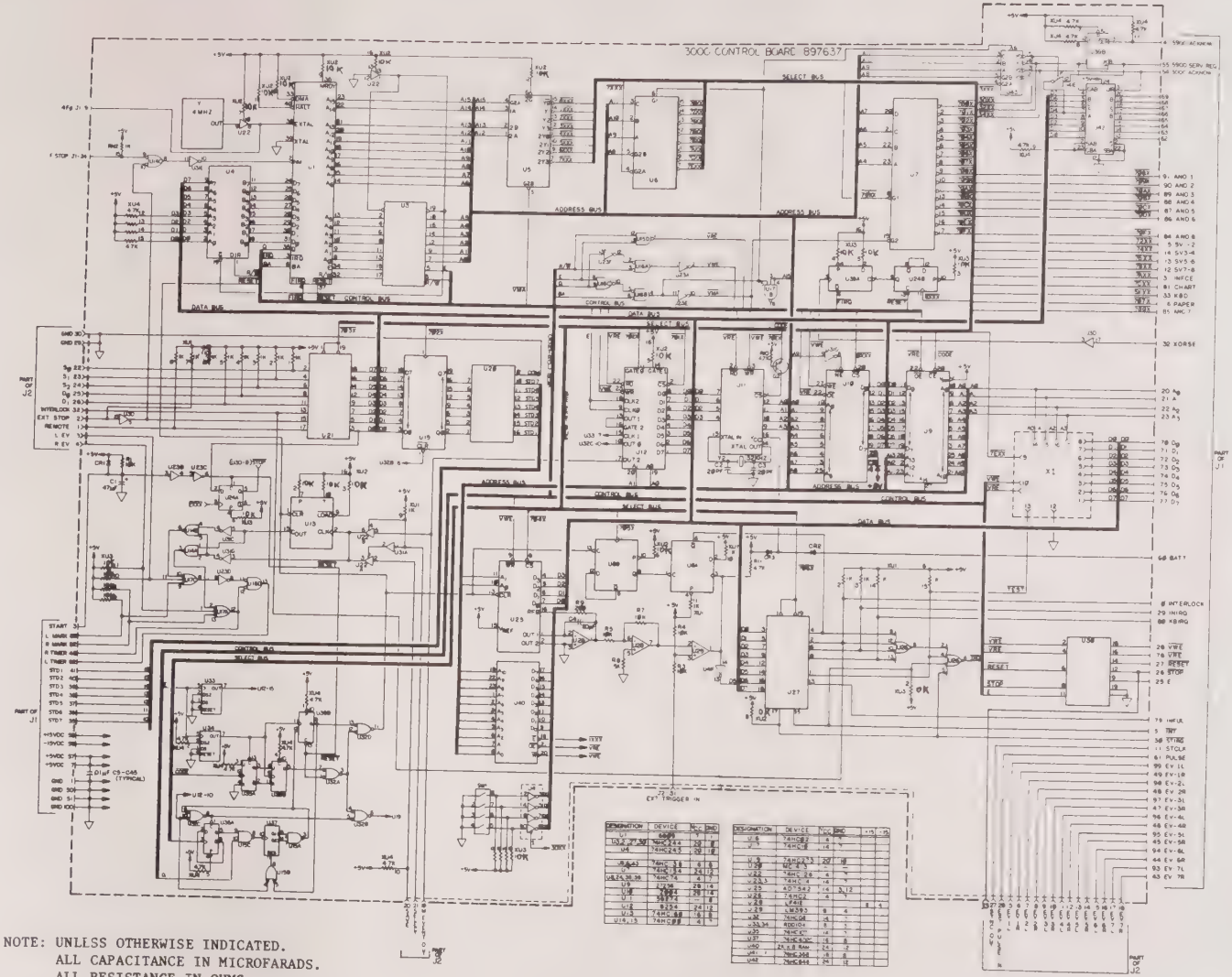
NOTES:

REVISIONS		
SYM	DESCRIPTION	DATE
C-1	NOT AFFECTED DCN 32590	1-8-86
D-1	REVISED PER DCN 32897	5-6-86
E	NOT AFFECTED PER DCN 33201 SWAITZ	8-6-86

BOARD ASSY., IRIG 897636

BY	DATE	NAME	
DR P.MILLER	11/4/86	SCHEMATIC	Gould Inc. Instruments Division Cleveland, Ohio 44114 U.S.A.
CH CZECH	11/4/86		
APP J.MATTES	11/4/86	CODE IDENT 96795	SIZE CODE G
			DWG NO. 297636

297636



Y	REV'D PER DCN 35595 CLARK	6-12-89

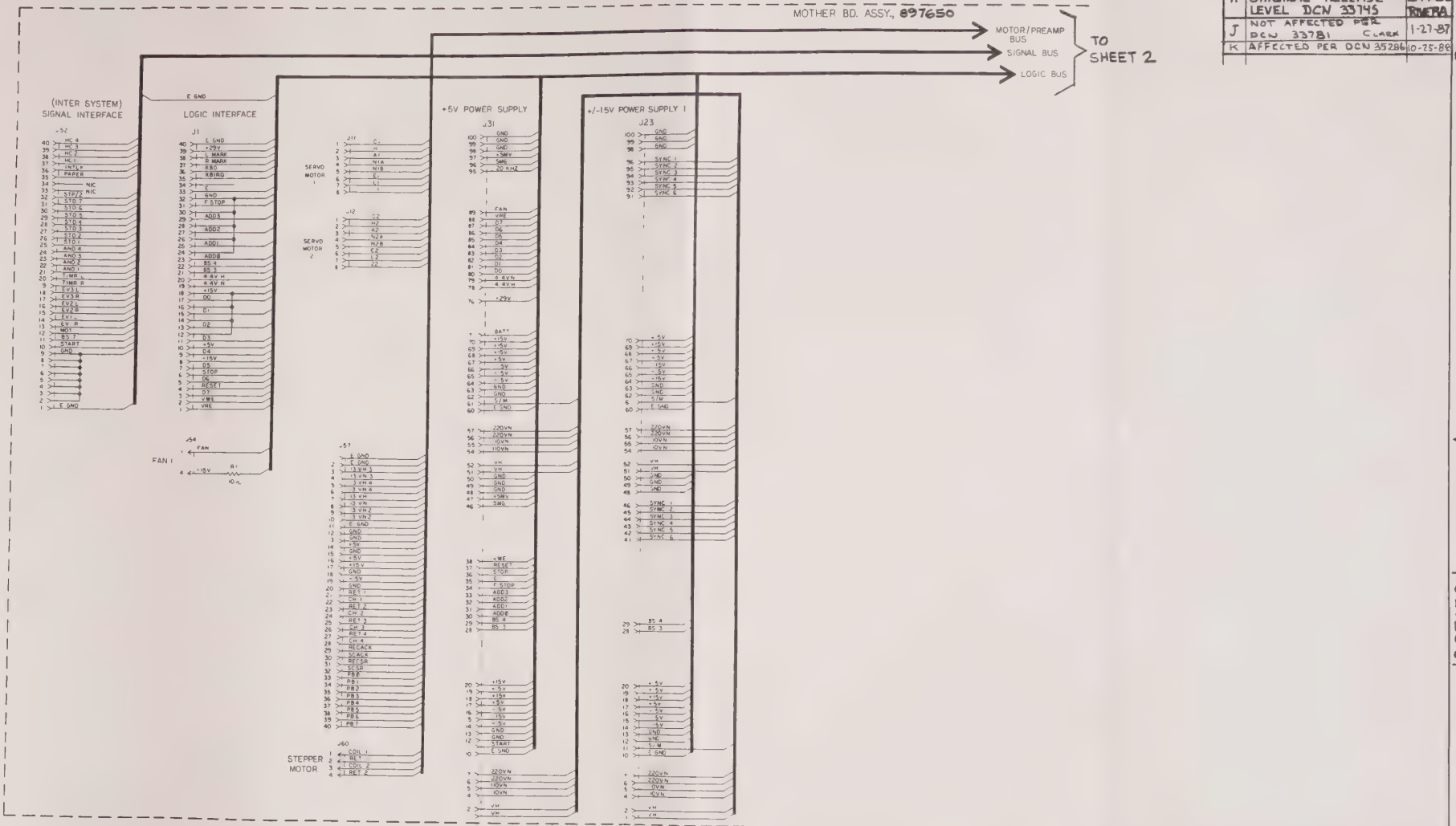
NOTE: UNLESS OTHERWISE INDICATED.
ALL CAPACITANCE IN MICROFARADS.
ALL RESISTANCE IN OHMS.
ALL RESISTORS .25 WATT, 10%.

897637-1

BOARD ASSY, CONTROL 897637

BY	DATE	NAME	SCHEMATIC	Gould Inc. Instruments Division Cleveland, Ohio 44114 U.S.A.
J. KOCHIS	11/86			
J. SWARTZ	11/86			
K. RAIZEL	12/86			
		CODE IDENT 96795	ISSUE CODE G	SHEET NO. 297637

89 88 87



REVISIONS			
SYM	DESCRIPTION	DATE	
H	ORIGINAL RELEASE LEVEL DCN 33745	12-19-86	MF
J	NOT AFFECTED PER DCN 33781 Clark	1-27-87	MF
K	AFFECTED PER DCN 35286	10-25-88	MF

297650 |

BOARD ASS'Y., MOTHER 897650 2 CH.

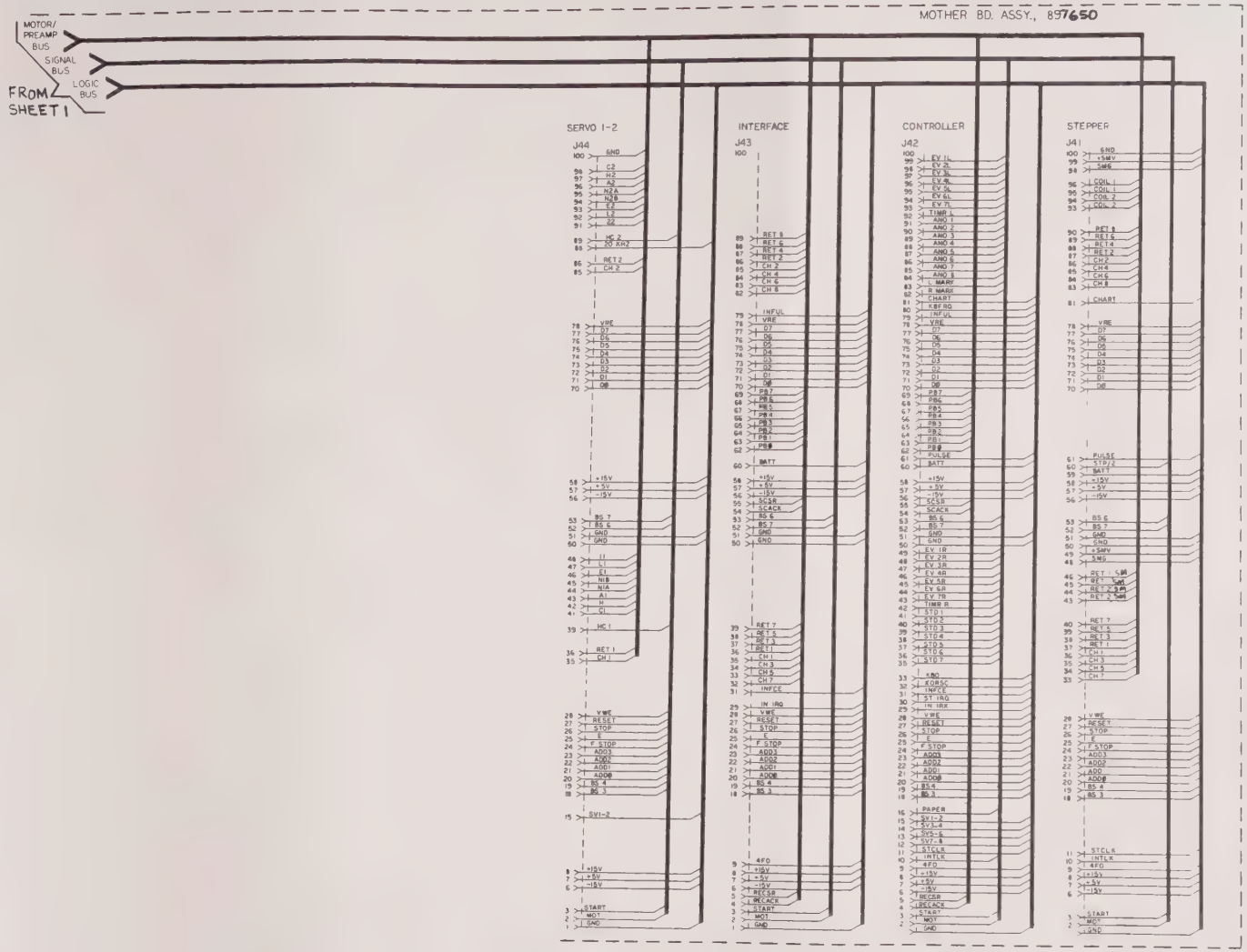
BY	DATE	NAME
DR BREMENOUR	11/86	SCHEMATIC
CH Dorant	12-19-86	
APP	12-19-86	

CODE IDENT 96795 | ISSUE CODE G

Gould Inc.
Instruments Division
Cleveland, Ohio 44114 U.S.A.

DWG. NO. 297650

SHEET 1 OF 2



REVISIONS		
BY	DESCRIPTION	DATE

297650

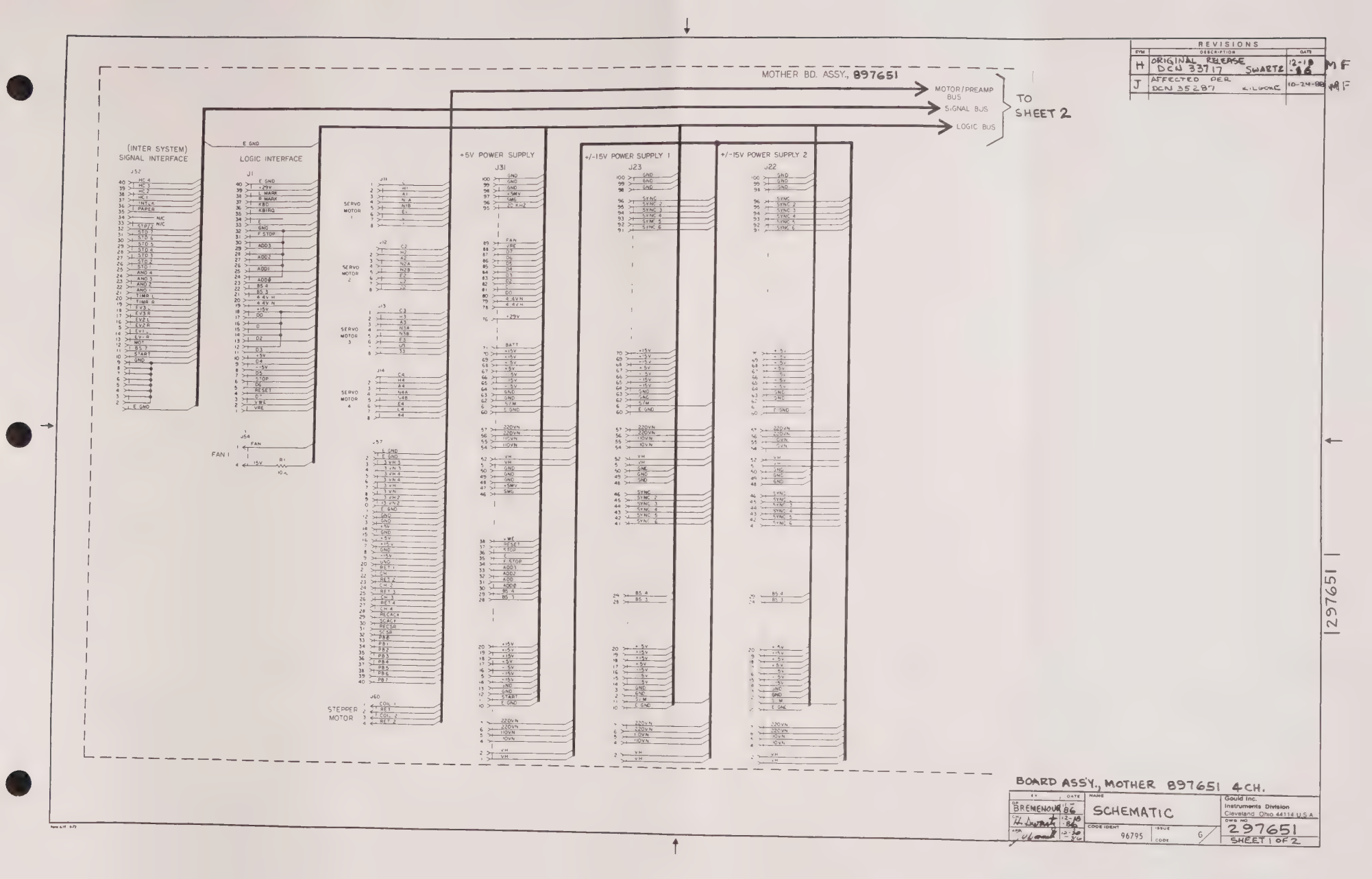
BOARD ASS'Y., MOTHER 897650 2 CH.

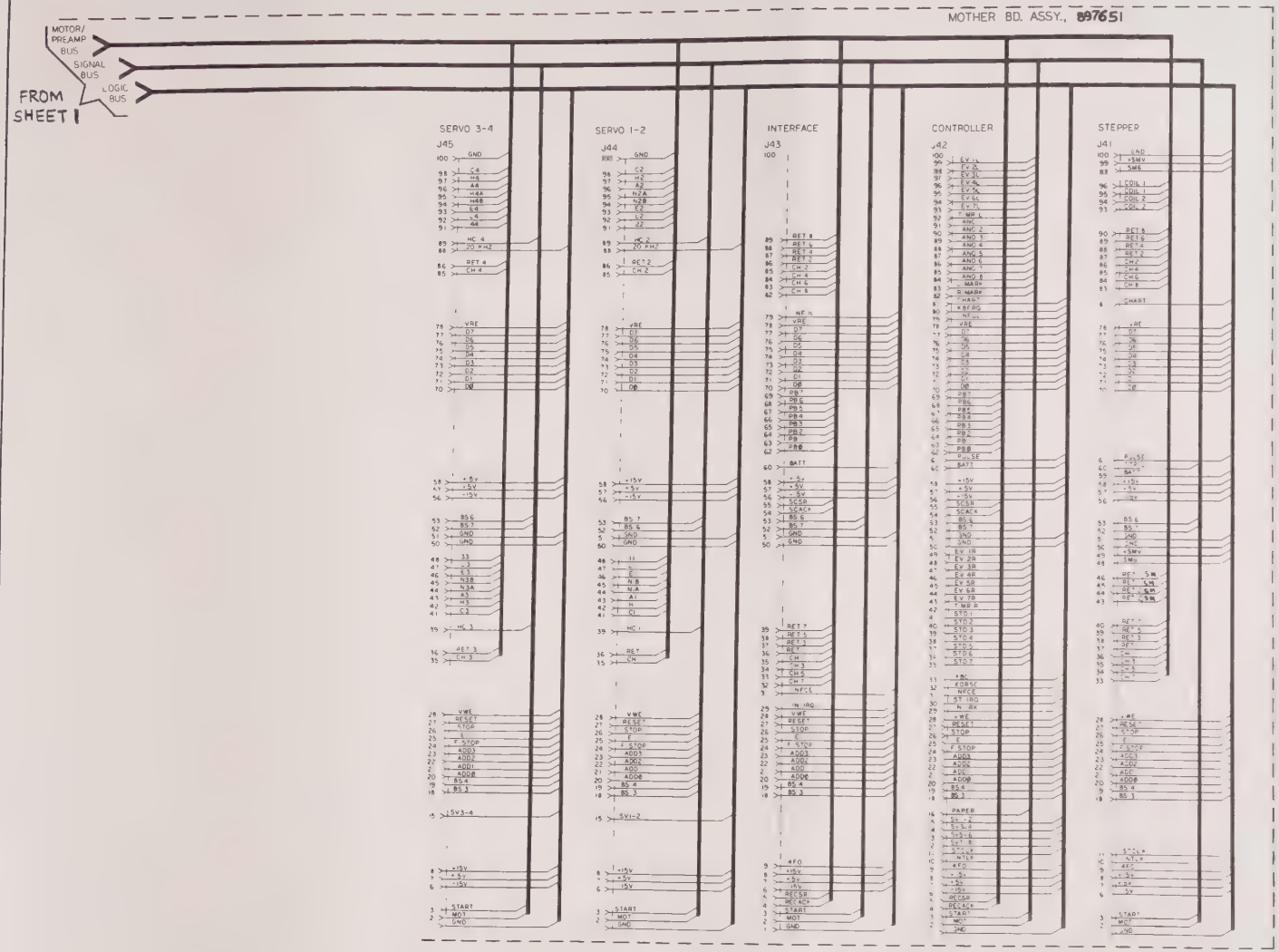
	BY	DATE	NAME
DR	BREMENOUR	11-26	SCHEMATIC
		12-29-86	
		12-30-86	

CODE IDENT 96795 | ISSUE CODE G

Gould Inc. Instruments Division Cleveland, Ohio 44114 U.S.A.

DWG NO 297650 SHEET 2 OF 2


REVISIONS
SYM | DESCRIPTION | DATE
H | ORIGINAL RELEASE DCN 33717 SWARTZ | 12-18-86 MF
J | AFFECTED PER DCN 35287 KILGORE | 10-24-88 MF
MOTHER BD. ASSY., 897651
MOTOR/PREAMP BUS
SIGNAL BUS
LOGIC BUS
TO SHEET 2
(INTER SYSTEM) SIGNAL INTERFACE
J52
LOGIC INTERFACE
J1
E GND
+29V
L MARK
R MARK
KBC
KBIRQ
E
GND
F STOP
ADD3
ADD2
ADD1
ADD0
BS 4
BS 3
4.4V N
+15V
D0
D1
D2
VRE
D3
+5V
D4
-15V
D5
STOP
DC
RESET
D-
VRE
D7
START
GND
FAN
FAN 1
J54
R1
10 A
SERVO MOTOR 1
J11
SERVO MOTOR 2
J12
SERVO MOTOR 3
J13
SERVO MOTOR 4
J14
J57
STEPPER MOTOR
J60
COIL 1 RET
COIL 2 RET 2
+5V POWER SUPPLY
J31
+/-15V POWER SUPPLY 1
J23
+/-15V POWER SUPPLY 2
J22
SYNC
SYNC 2
SYNC 3
SYNC 4
SYNC 5
SYNC 6
220VN
110VN
10VN
VM
BATT
+15V
+5V
-5V
-15V
GND
S/M
F GND
VRE
RESET
STOP
F STOP
ADD3
ADD2
ADD
ADD0
BS 4
BS 3
297651
BOARD ASS'Y., MOTHER 897651 4CH.
SCHEMATIC
BRENEMOUR 12-18-86
Gould Inc.
Instruments Division
Cleveland Ohio 44114 U.S.A.
CODE IDENT 96795
ISSUE CODE G
DWG NO 297651
SHEET 1 OF 2



REVISIONS

SYM	DESCRIPTION	DATE

BOARD ASS'Y, MOTHER 897651 4CH,

BY	DATE	NAME
BRENENDOIR	86	
	12-23	
	12-30-86	

SCHEMATIC

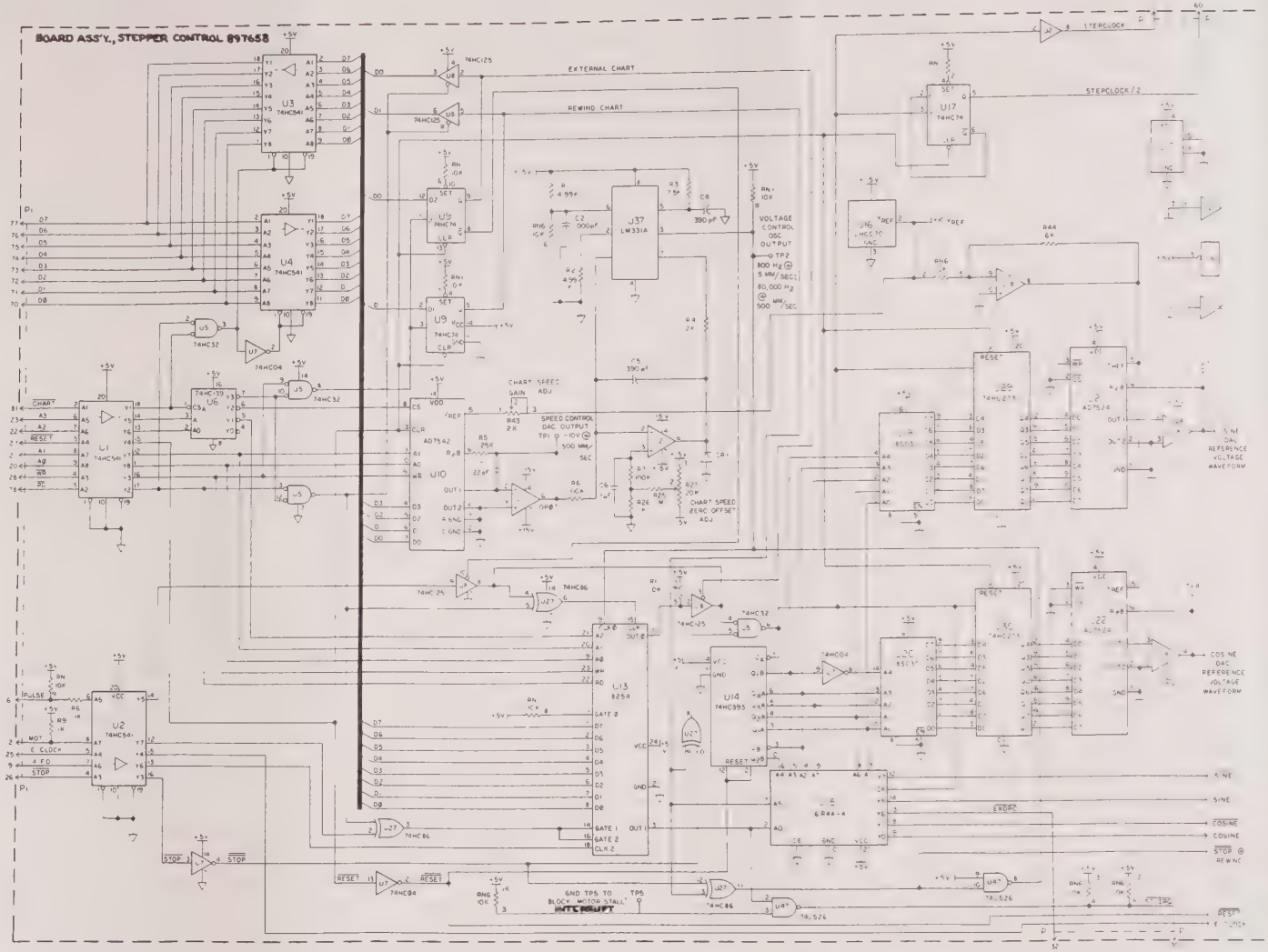
CODE IDENT 96795 | ISSUE CODE G

Gould Inc. Instruments Division Cleveland, Ohio 44114 U.S.A.

DWG NO 297651

SHEET 2 OF 2

297651



REVISIONS		
SYM	DESCRIPTION	DATE
E-1	ORIGINAL REL. ISSUE LEVEL. DCN 33660/A SOTEROS	1-30-87
F-1	REVISED PER DCN 34313/A SOTEROS	7-6-87

35453

297658

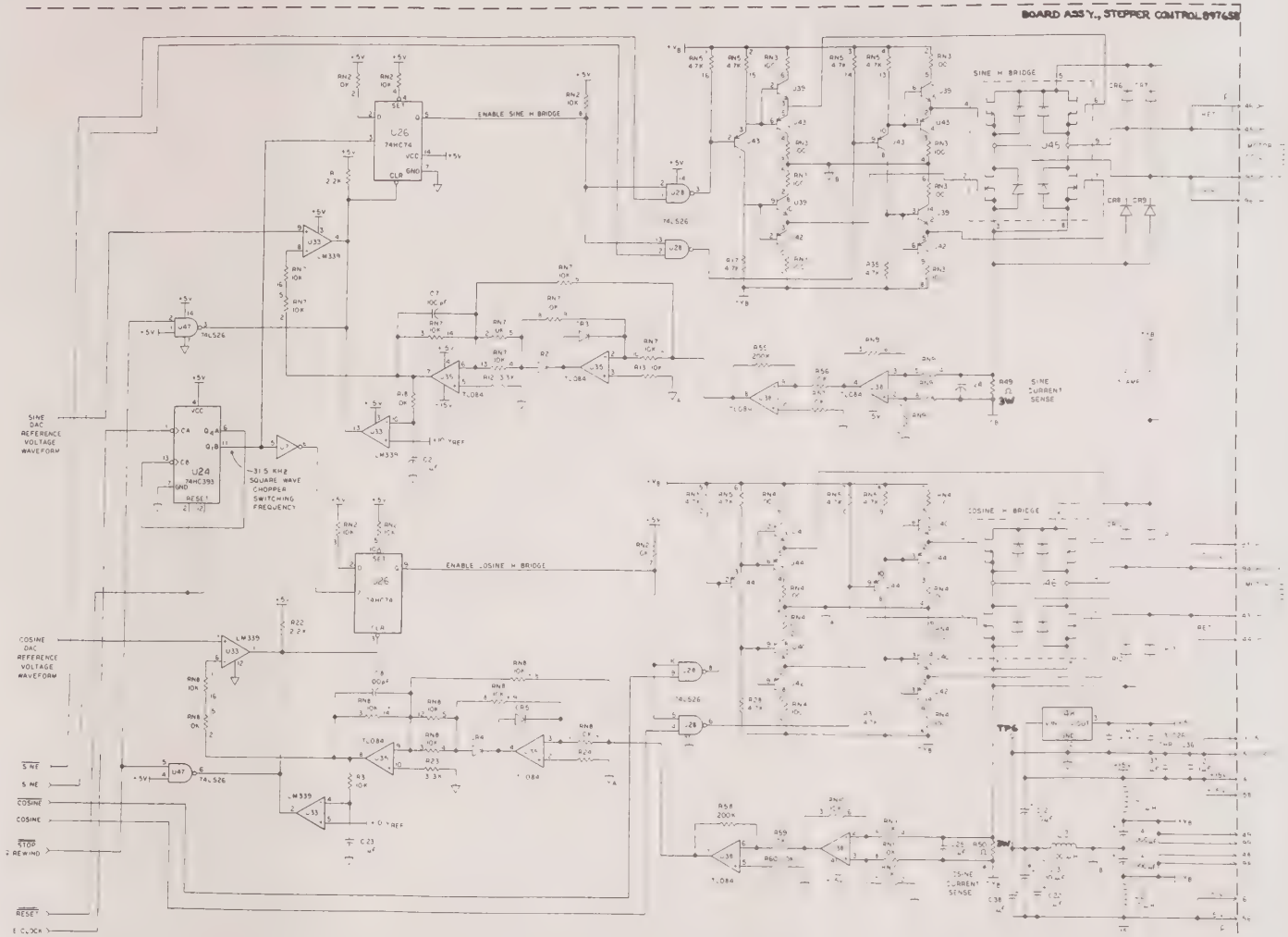
⚠S THIS BOARD CONTAINS STATIC SENSITIVE COMPONENTS AND MUST BE HANDLED PER MEI-0011.

1. UNLESS OTHERWISE INDICATED, ALL CAPACITANCE IN MICROFARADS. ALL RESISTANCE IN OHMS. ALL RESISTORS ±1%, 1/4 WATT.

NOTES:

BOARD ASS'Y., STEPPER CONTROL 897658

BY	DATE	NAME	Gould Inc Instruments Division Cleveland Ohio 44114 U.S.A.
DR B. BRENEMAN	11-20-87	SCHEMATIC	
CH H. Swartz	11-30-87		DWG NO 297658
APP D. Dolan	12/3/87	CODE IDENT 96795	ISSUE CODE G
			SHEET 1 OF 2



REVISIONS		F-1
SYM	DESCRIPTION	DATE

297658

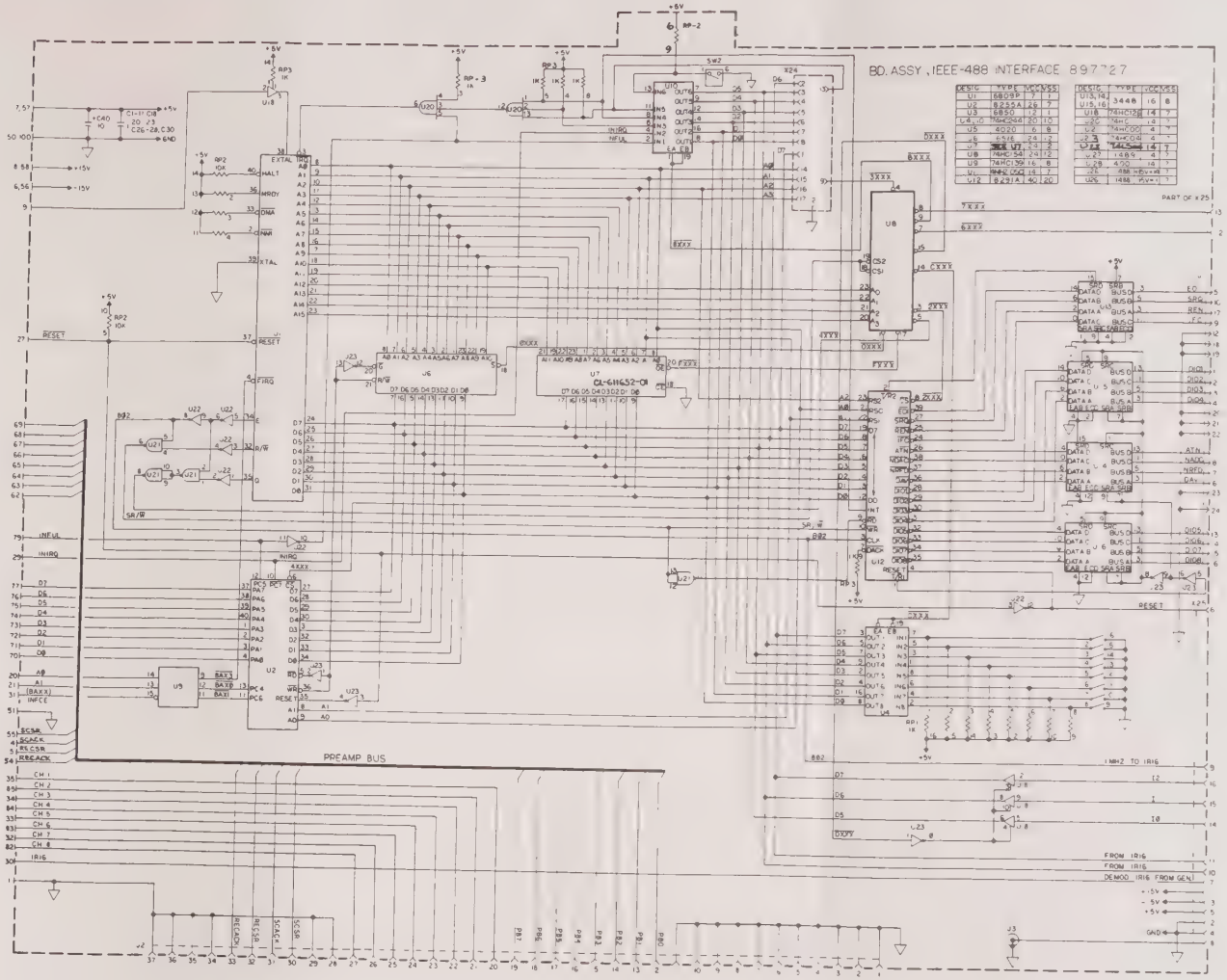
BOARD ASS'Y., STEPPER CONTROL 897658

BY	DATE	NAME
C. BRAMENDA	1-30-87	SCHEMATIC
	2-4-87	
	2-9-87	
	1/30/87	

Gould Inc
Instruments Division
Cleveland Ohio 44114 U.S.A.

CODE IDENT	ISSUE	DWG NO
96795	G	297658

SHEET 2 OF 2

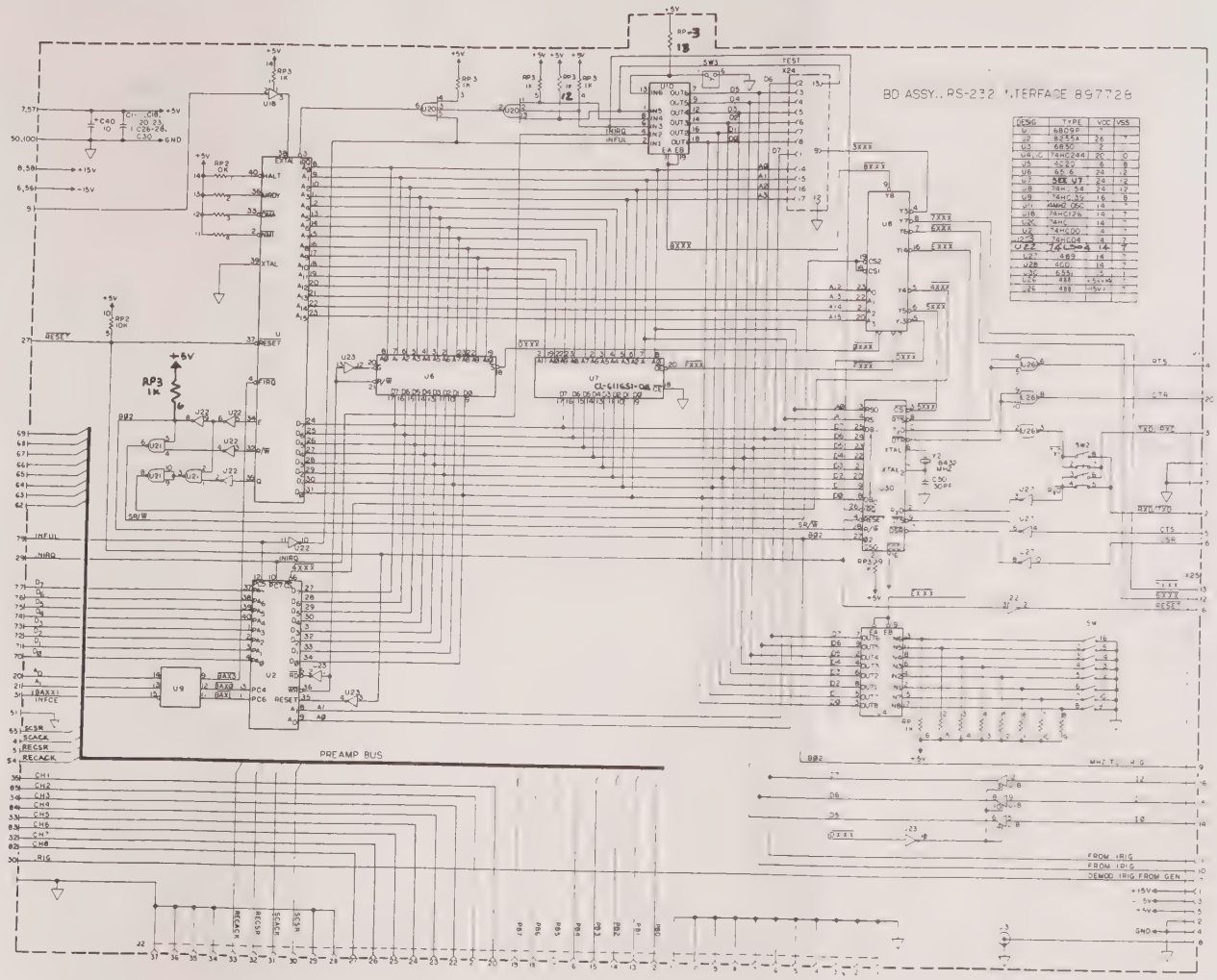


REVISIONS			
SYM	DESCRIPTION		DATE
E	ORIGINAL RELEASE DCN 33708 SWARTZ		12-18-86
F	NOT AFFECTED DCN 33829 CLARK		2-19-87
G-1	UT WAS: TYPE 2732 PER DCN 34165/A 30TEROS		5-4-87
H	NOT AFFECTED PER DCN KILMORE 34386		8-4-87
J	NOT AFFECTED PER DCN 34890 RIVERA		8-28-88
K	NOT AFFECTED PER DCN 35126 KISNER		8-30-88
L	NOT AFFECTED PER DCN 35376 KISNER		12-9-88
M	REVISED PER DCN 35450. KISNER		1-23-89

297727

BOARD ASSY, IEEE-488 INTERFACE 897727

BY	DATE	NAME	Gould Inc Instruments Division Cleveland Ohio 44114 U.S.A.
DRN BIEBENDORF	11-26-86	SCHEMATIC	
CHK			DWG NO 297727
APP		CODE IDENT 96795	ISSUE CODE G



REVISIONS		
SYM	DESCRIPTION	DATE
D	ORIGINAL RELEASE DCN 33709 SWARTZ	12-18-86
E	NOT AFFECTED DCN 33830 CLARK	2-12-87
F-1	U7 WAS: TYPE 2732 PER DCN 34107/A SOTEROS	5-4-87
G	AFFECTS PWB PART TYPE ONLY	8-11-87
H	U7 WAS: -01 U22 WAS: 74HC04 PER DCN 34641. KISNER	11-5-
J	NOT AFFECTED PER DCN 34892 RIVERA	3-2-88
K	U7 WAS: -03. DCN 35084. KISNER	6-16-88
L	NOT AFFECTED PER DCN 35125. KISNER	8-30-88
M	NOT AFFECTED PER DCN 35376. KISNER	12-7-88
N	NOT AFFECTED PER DCN 35388 KISNER	1-3-89
P	NOT AFFECTED PER DCN 35452. KISNER	1-23-89

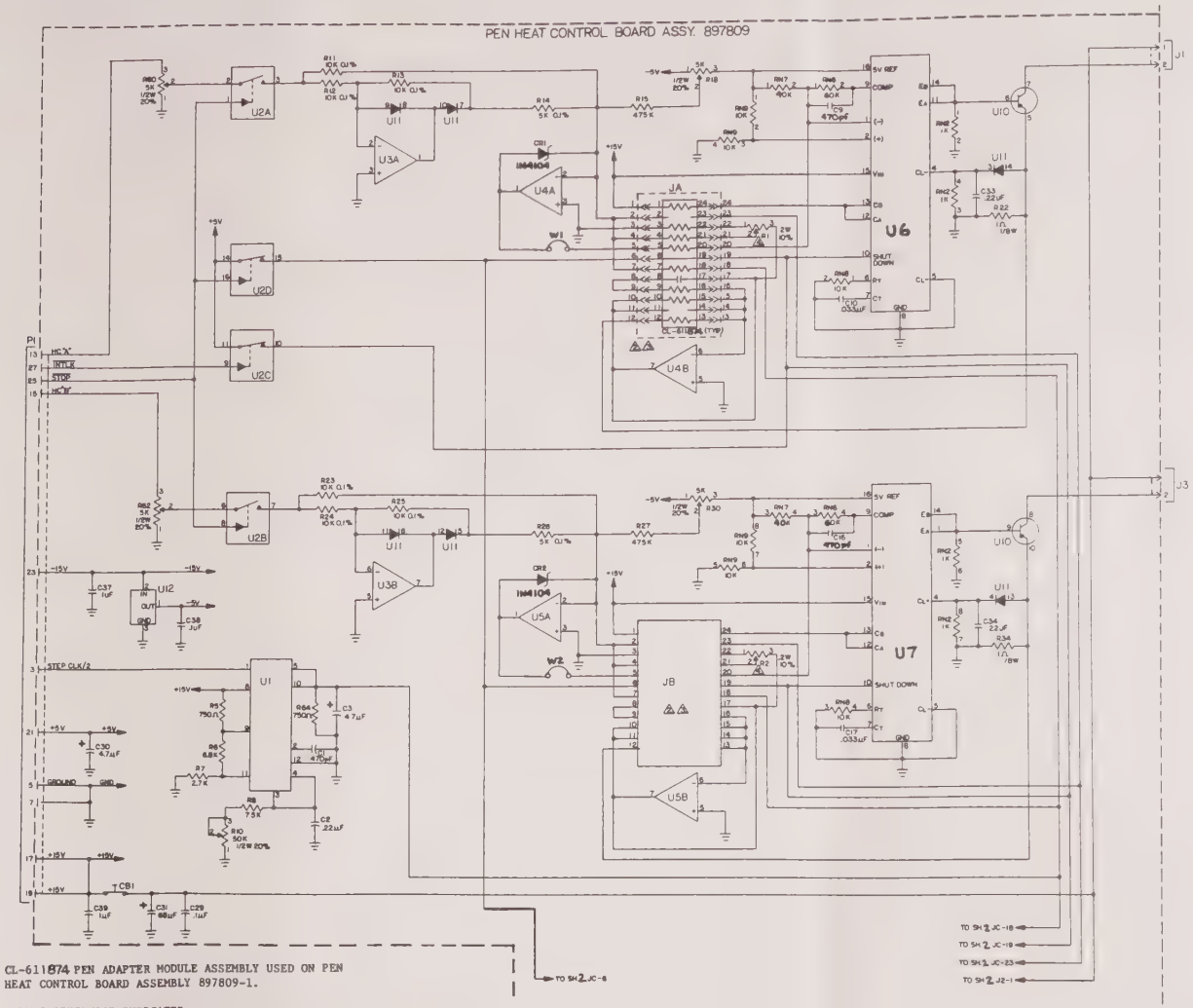
5-2-90

DESG	TYPE	VCC	VSS
U1	68B09E	7	1
U2	8255A	26	7
U3	6850	2	
U4, 5	74HC244	20	10
U5	4520	6	8
U6	65 S 6	24	12
U7	SEE U7	24	12
U8	74H-54	24	12
U9	74HC32	16	8
U11	MMHO 050	16	8
U16	74HC126	14	7
U20	74HC	14	7
U21	74HC00	14	7
U22	74HC04	14	7
U23	74LS08	14	7
U27	889	14	7
U28	4020	16	8
U30	5551	14	7
U26	488	+5V	GND
U26	488	+5V	GND

BOARD ASS'Y, RS-232 INTERFACE 897728

BY	DATE	NAME	Gould Inc. Instruments Division Cleveland Ohio 44114 U.S.A.
DR BREMENOUR	12/18/86	SCHEMATIC	
CH Swartz	12/18/86	CODE IDENT 96795	DWG NO 297728
APP J Mack	12/18/86	ISSUE CODE G	

297728 1



⚠2 CL-611874 PEN ADAPTER MODULE ASSEMBLY USED ON PEN HEAT CONTROL BOARD ASSEMBLY 897809-1.

1. UNLESS OTHERWISE INDICATED:

ALL CAPACITANCE IN MICROFARADS.
ALL RESISTANCE IN OHMS.
ALL RESISTORS ARE 1/4W, 1%

⚠1 USER TRACE DENSITY ADJUST.

⚠3 CL-610464 PEN ADAPTER MODULE ASSEMBLY USED ON PEN HEAT CONTROL BOARD ASSEMBLY 897809-2.

REVISIONS			
BYTE	DESCRIPTION		DATE
H	ORIGINAL RELEASE DCN 33793	SWARTZ	1-14-87
J	NOT AFFECTED PER DCN 33848	CLARK	2-6-87
K	NOT AFFECTED PER DCN 33953	CLARK	2-27-87
L-1	REVISED PER DCN 34306/A.S.		8-26-87
M	REV'D PER DCN 34737/RIVERA		12-17-87
N	REVISED PER DCN 34919/A.S.		4-12-88
P	REVISED PER DCN 35110/A.S.		6-23-88

MF

297809

PEN HEAT CONTROL BOARD ASSY 897809

BY	DATE
DR J. KECHIS	1-87
	1-29-87
	1-29-87

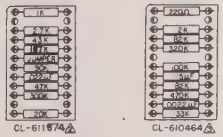
NAME: SCHEMATIC

Gould Inc.
Instruments Division
Cleveland, Ohio 44114 U.S.A.

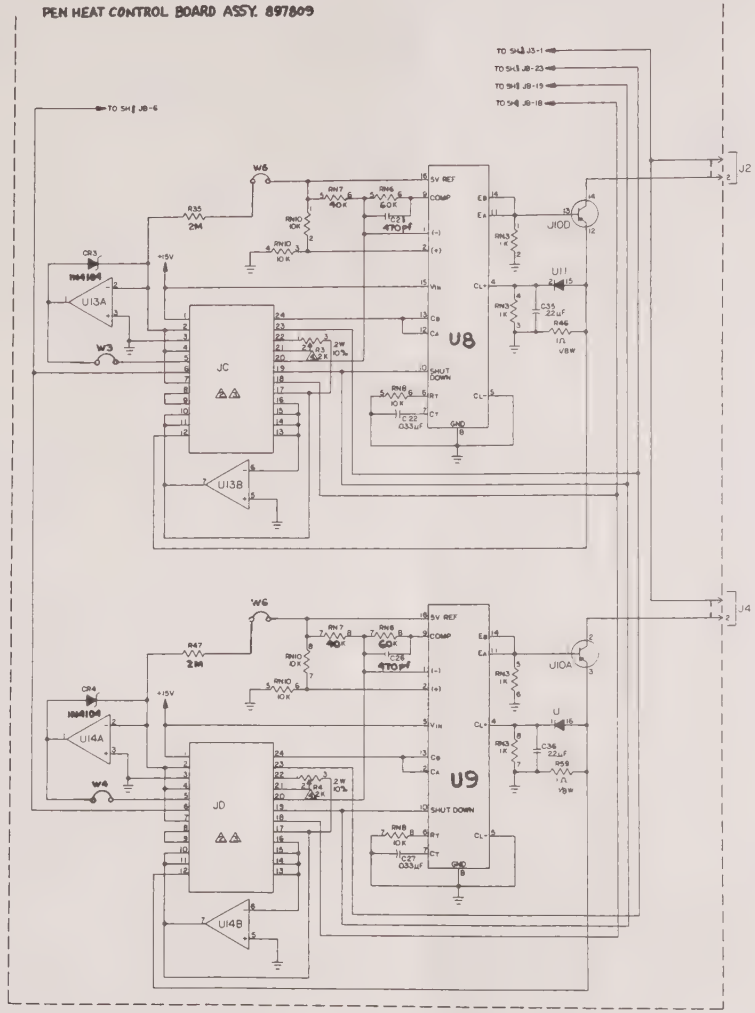
CODE IDENT: 96795 | ISSUE CODE: G | DWG. NO. 297809 | SHEET 1 OF 2

REVISIONS		
SYM	DESCRIPTION	DATE
P		

PEN HEAT CONTROL BOARD ASSY. 897809



DEVICE	+15V	-15V	+5V	-5V	GND	DESIGNATION
LM2917	8	—	—	—	12	U1
LF13333	12	5	—	—	4	U2
LT1013DMB	8	4	—	—	—	U3,4,5,13,14
LM3524N	15	—	—	—	8	U6,7,8,9
MPQ 3725	—	—	—	—	—	U10
FSA2815P	—	—	—	—	—	U11
MC79L05CP	—	2	—	—	1	U12
CL-611874	—	—	—	—	—	U13,14,15,16
CL-610464	—	—	—	—	—	U13,14,15,16



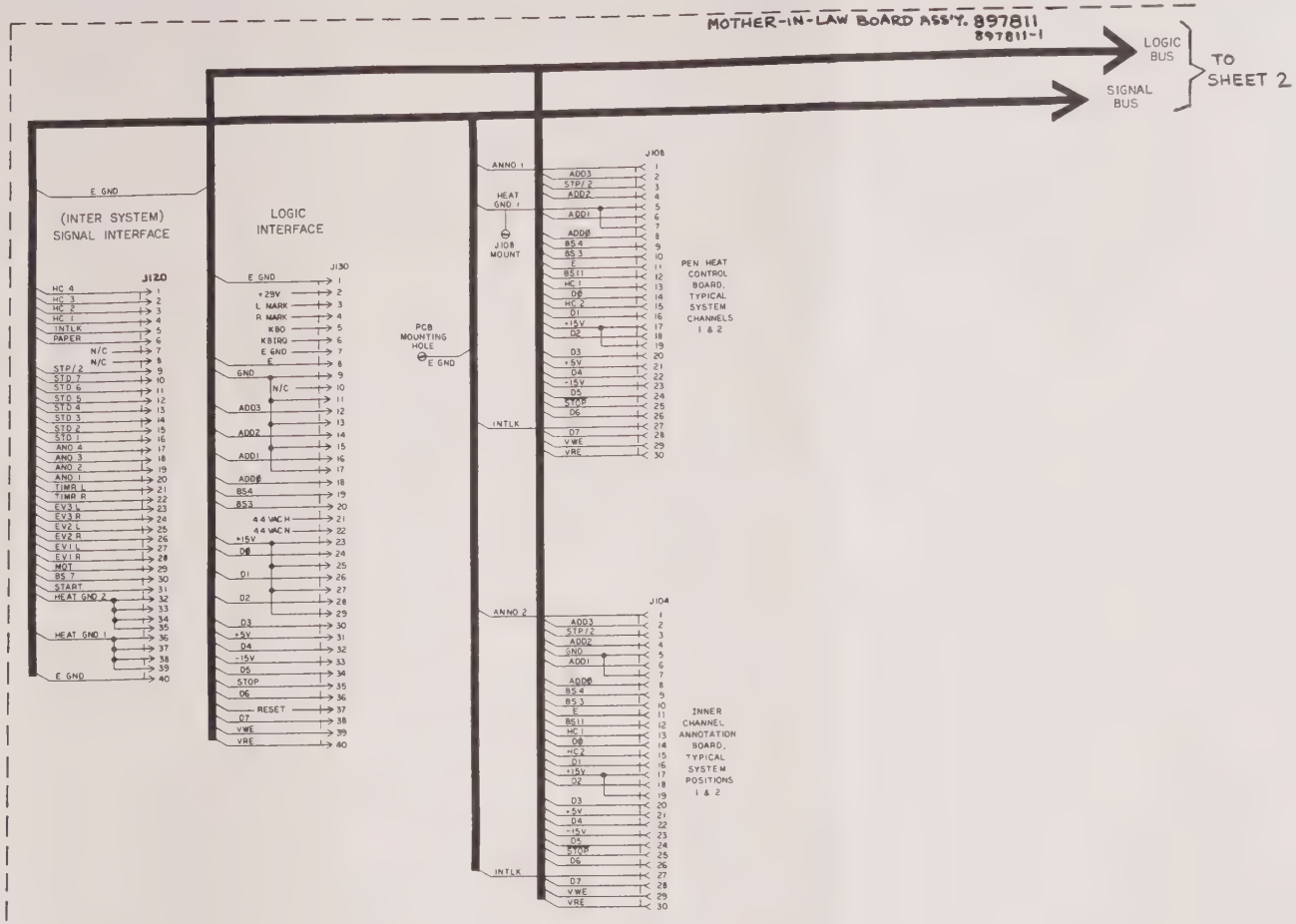
PEN HEAT CONTROL BOARD ASSY. 897809

BY	DATE	NAME
DR J. Kachis	8-87	SCHEMATIC
E. Dunphy	8-87	
D. Smith	8-87	

Gould Inc.
Instruments Division
Cleveland, Ohio 44114 U.S.A.

CODE IDENT. 96795 | ISSUE CODE G | DWG. NO. 297809 | SHEET 2 OF 2

297809



REVISIONS			
SYM.	DESCRIPTION	DATE	
F	ORIGINAL RELEASE DCN 33743 SWARTZ	12-29-86	MT
G-1	REV'D PER DCN 33969	4-6-87	MT
H	REVISED PER DCN 34426/A SOTEROS	10-1-87	
J	REVISED PER DCN 34681/A SOTEROS	2-19-88	
K	C123 WAS: .1uf/ DCN 35057/A.S.	5-25-88	
L	NOT AFFECTED. DCN 35724	9-5-89	

297811

897811-1

BOARD ASS'Y, MOTHER-IN-LAW 897811

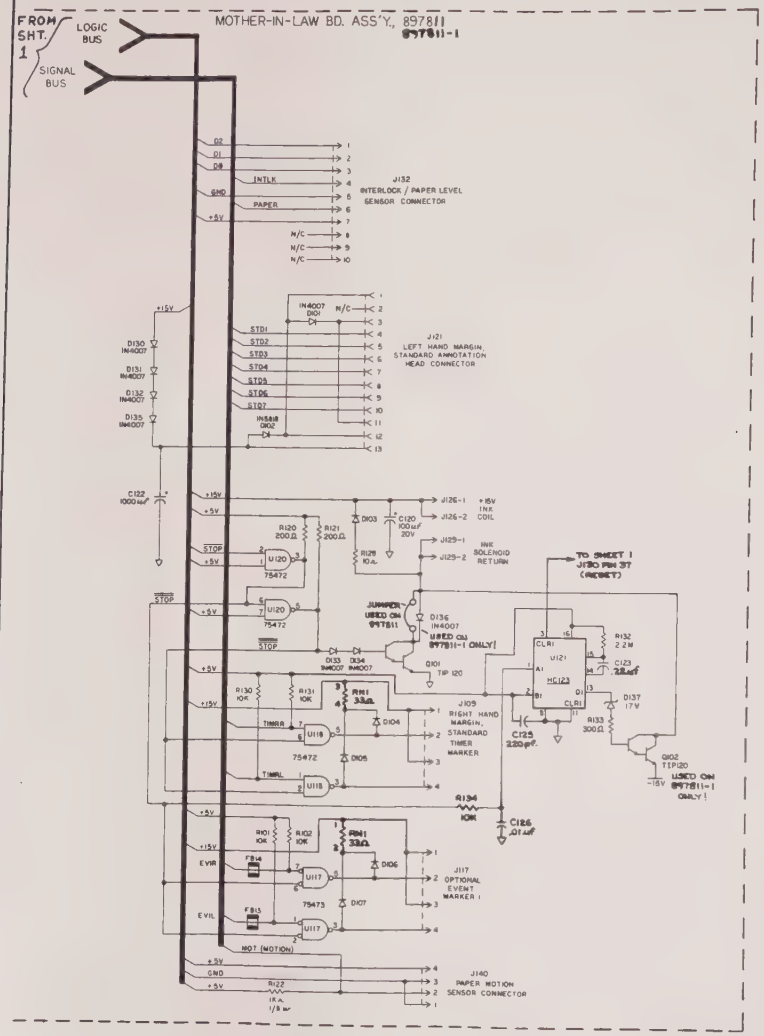
BY	DATE	NAME
DD BREMENOUR	12/86	SCHEMATIC
CHK	12-19-86	
APP	10-30-87	

CODE IDENT 96795 | ISSUE CODE G

Gould Inc.
Instruments Division
Cleveland, Ohio 44114 U.S.A.

DWG. NO. 297811

SHEET 1 OF 2



REVISIONS		
SYM	DESCRIPTION	DATE

297811-1

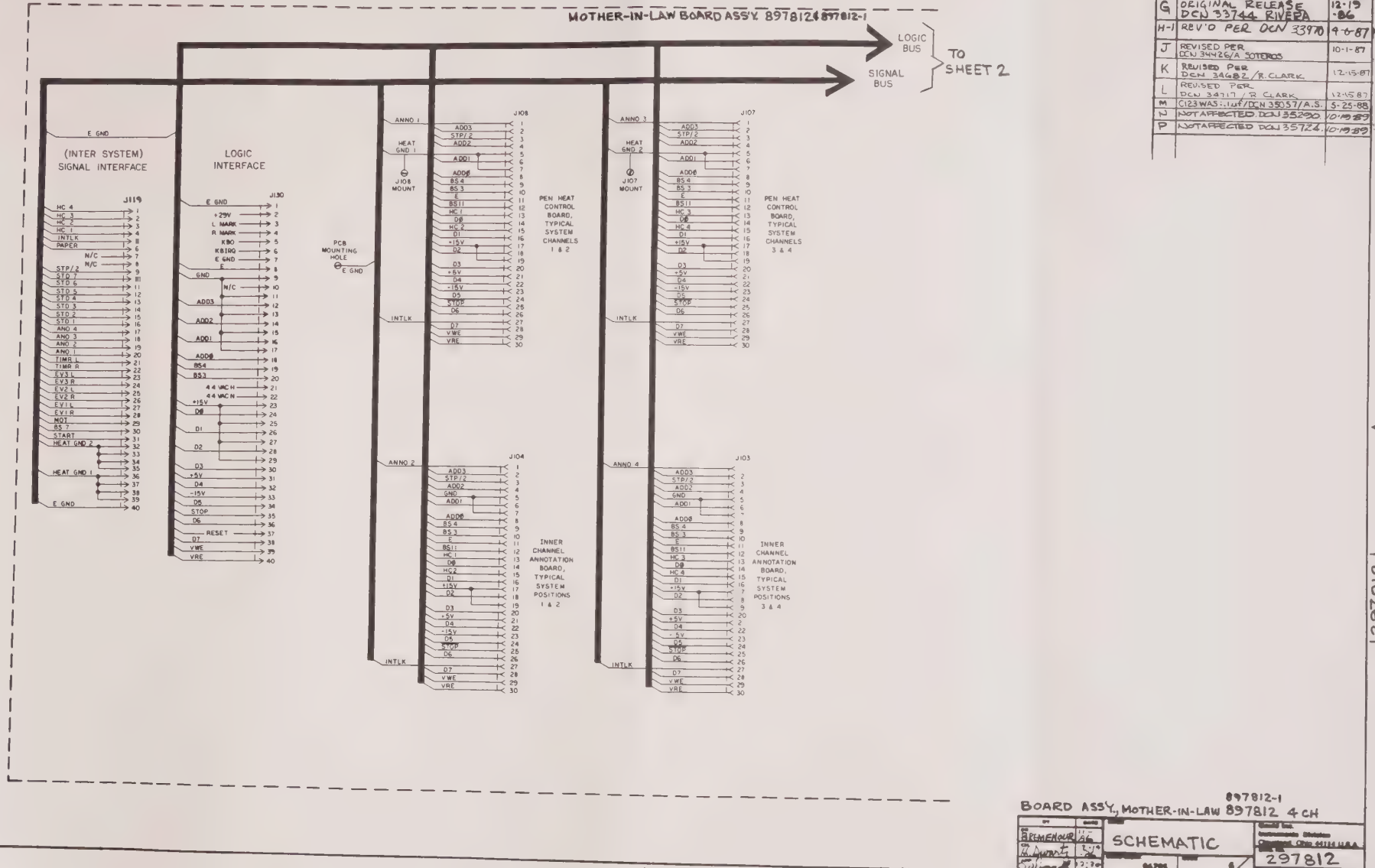
897811-1
BOARD ASS'Y., MOTHER-IN-LAW 897811 2 CH.

BY	DATE
DRAWN BREMENOUR	12-7-78
CH. E. Smith	12-7-78
APP. G.O. Kennell	12-7-78

NAME: SCHEMATIC

Gould Inc
Instruments Division
Cleveland, Ohio 44114 U.S.A.

CODE IDENT: 96795
ISSUE CODE: G
DWG. NO: 297811
SHEET 2 OF 2



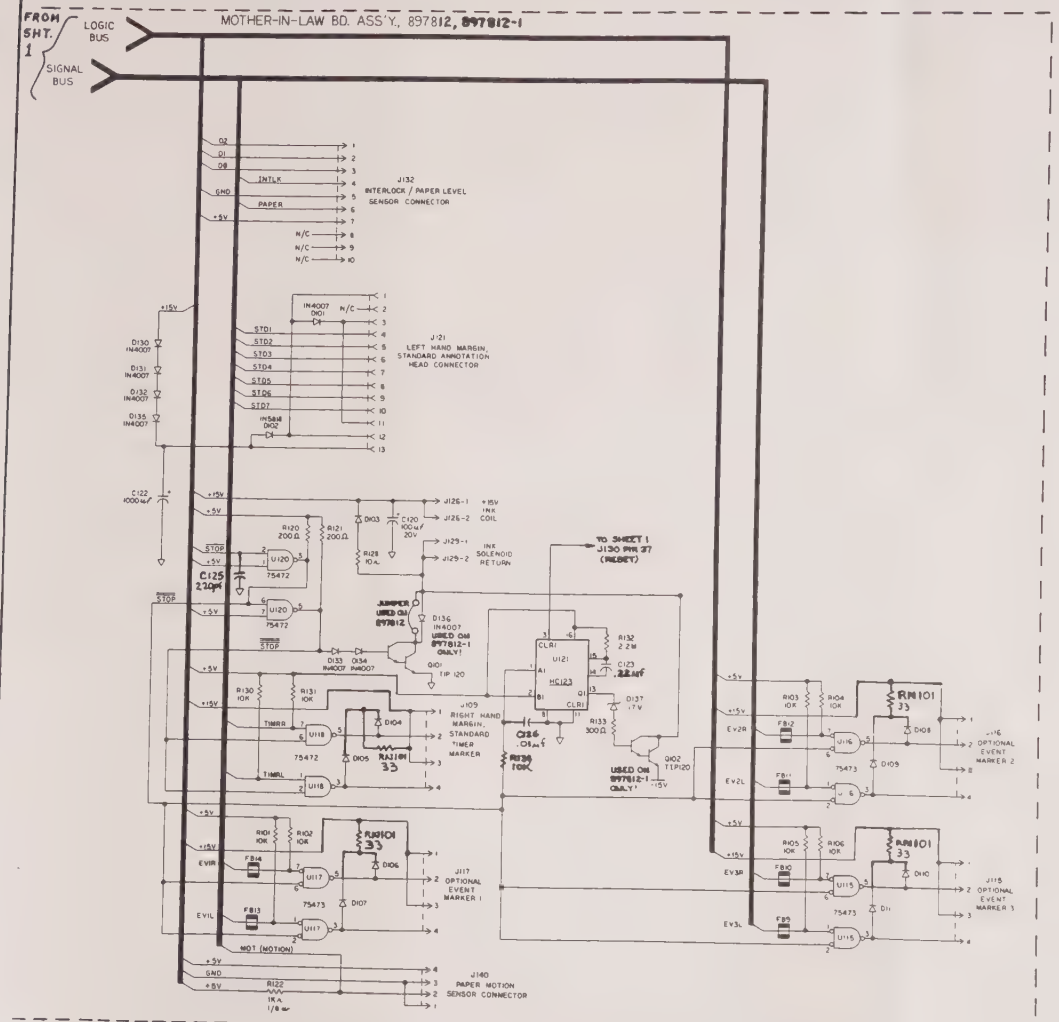
REVISIONS		
SYM	DESCRIPTION	DATE
G	ORIGINAL RELEASE DCN 33744 RIVERA	12-19-86
H-1	REV'D PER DCN 33970	4-6-87
J	REVISED PER DCN 34426/A SOTEROS	10-1-87
K	REVISED PER DCN 34682/R. CLARK	12-15-87
L	REVISED PER DCN 34717 / R CLARK	12-15-87
M	C123 WAS: 1.14 / DCN 35057/A.S.	5-25-88
N	NOT AFFECTED DCN 35290	10-19-89
P	NOT AFFECTED DCN 35724	10-19-89

297812

897812-1

BOARD ASS'Y, MOTHER-IN-LAW 897812 4 CH

DR	DATE	SCHEMATIC	
BREMENOUR	11-86		
CK			
APP			
		98795	297812
			SHEET 1 OF 2



REVISIONS

EVN	DESCRIPTION	DATE

1297812 |

897812-1

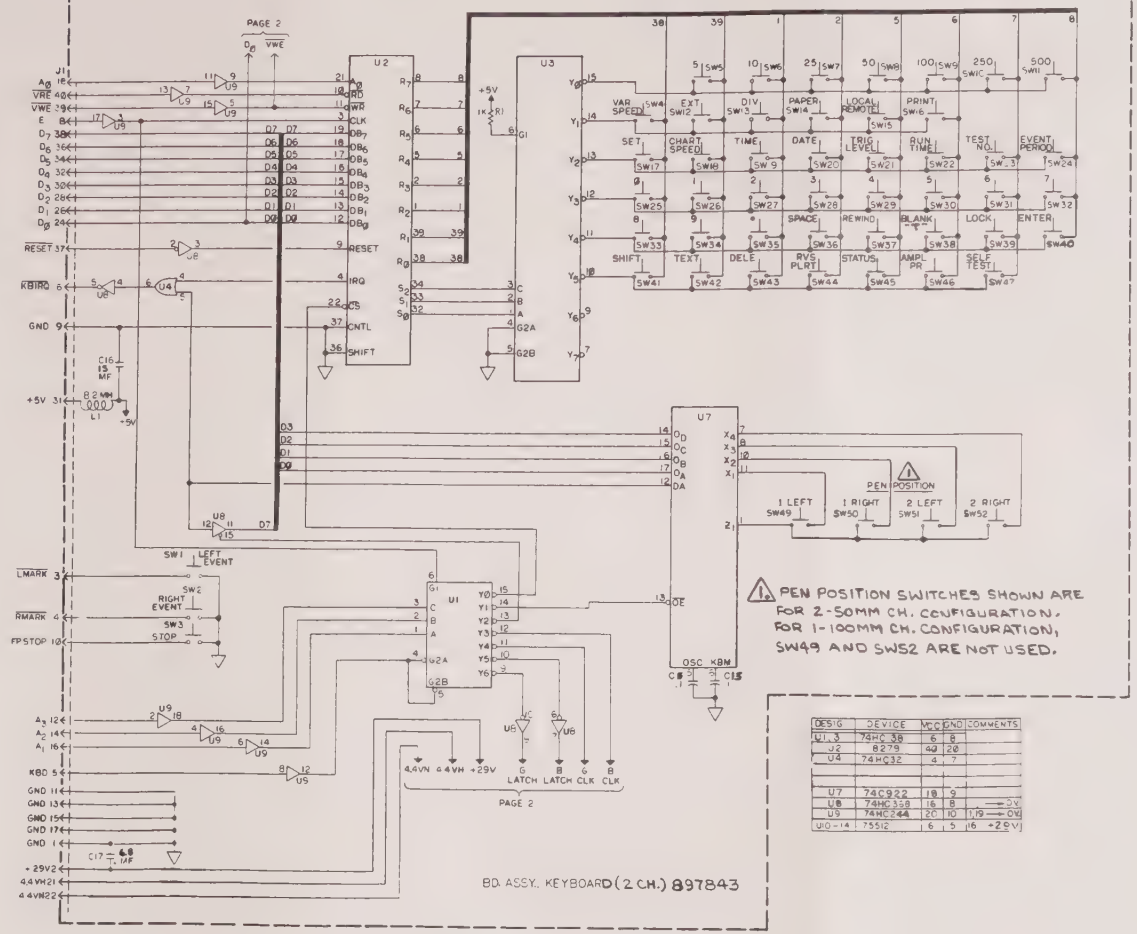
BOARD ASS'Y., MOTHER-IN-LAW 897812 4 CH

BY	DATE	NAME
BREMEMOR	11-86	SCHEMATIC
H. SMITH	1-87	
J.O. Harrell	12-86	

Gould Inc. Instruments Division Cleveland, Ohio 44114 U.S.A.

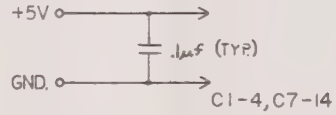
CODE IDENT. 96795 | ISSUE CODE G | DWG. NO. 297812 | SHEET 2 OF 2

REVISIONS			
SYM	DESCRIPTION	DATE	
D	ORIGINAL RELEASE DCN 33599 SWARTZ	11-10-86	MF
E-1	REVISED PER DCN 34057/A. SOTEROS	3-20-87	MF
F-1	NOT AFFECTED PER DCN 34298/A. SOTEROS	6-22-87	
G-1	NOT AFFECTED PER DCN 34940/A. SOTEROS	3-30-88	9F



⚠ PEN POSITION SWITCHES SHOWN ARE FOR 2-50MM CH. CONFIGURATION. FOR 1-100MM CH. CONFIGURATION, SW49 AND SW52 ARE NOT USED.

DESIG	DEVICE	VCC	GND	COMMENTS
U1, 3	74HC 38	6	8	
U2	8279	40	20	
U4	74HC32	4	7	
U7	74C922	18	9	
U8	74HC358	16	8	—0V
U9	74HC244	20	10	1,19 —0V
U10-14	7512	6	5	16 +29V



BD. ASSY., KEYBOARD (2 CH.) 897843

NOTE: UNLESS OTHERWISE INDICATED:
ALL CAPACITANCE IN MICROFARADS.
ALL RESISTANCE IN OHMS.
ALL RESISTORS .15 WATT, 2%.

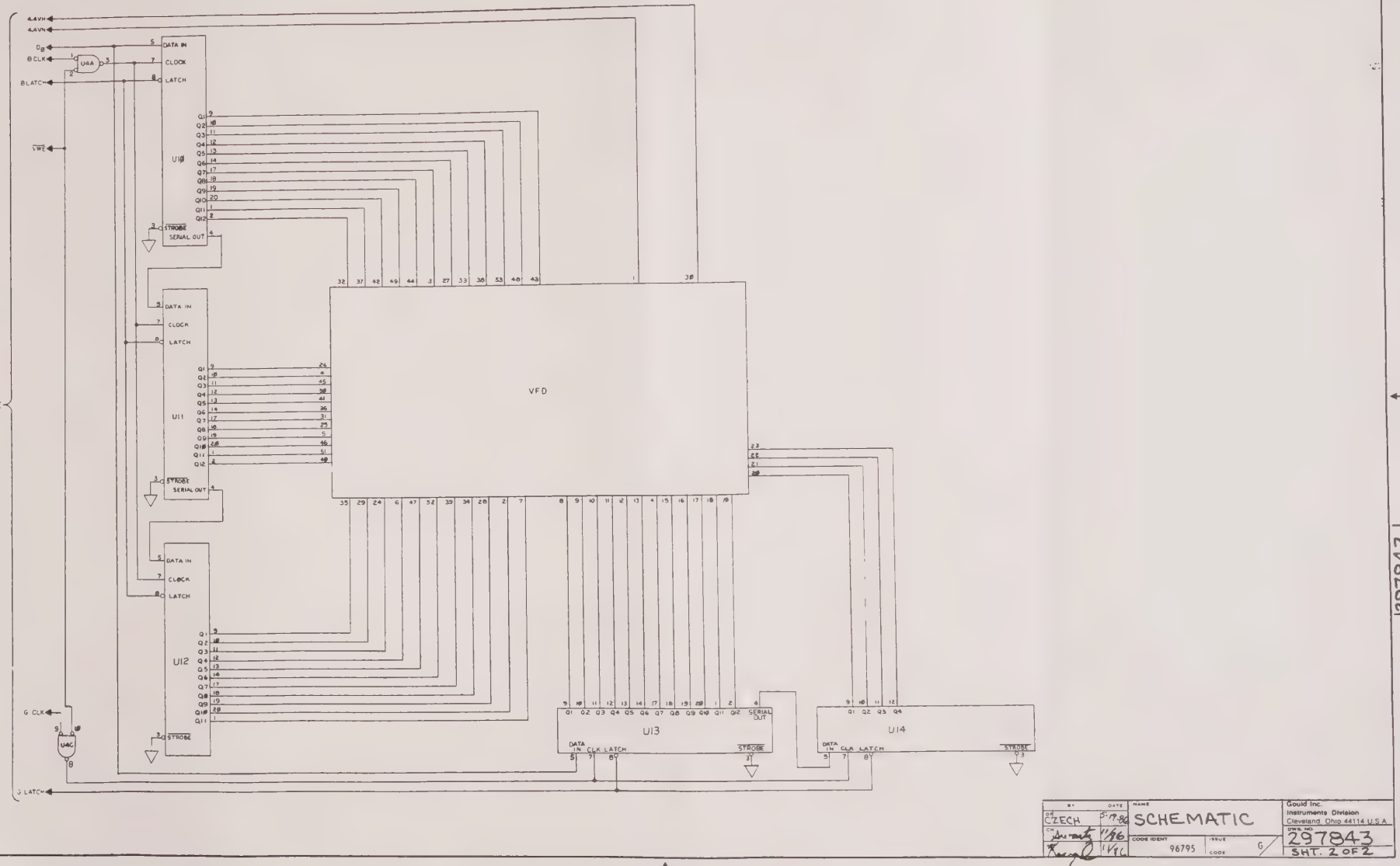
BOARD ASS'Y., KEYBOARD 897843

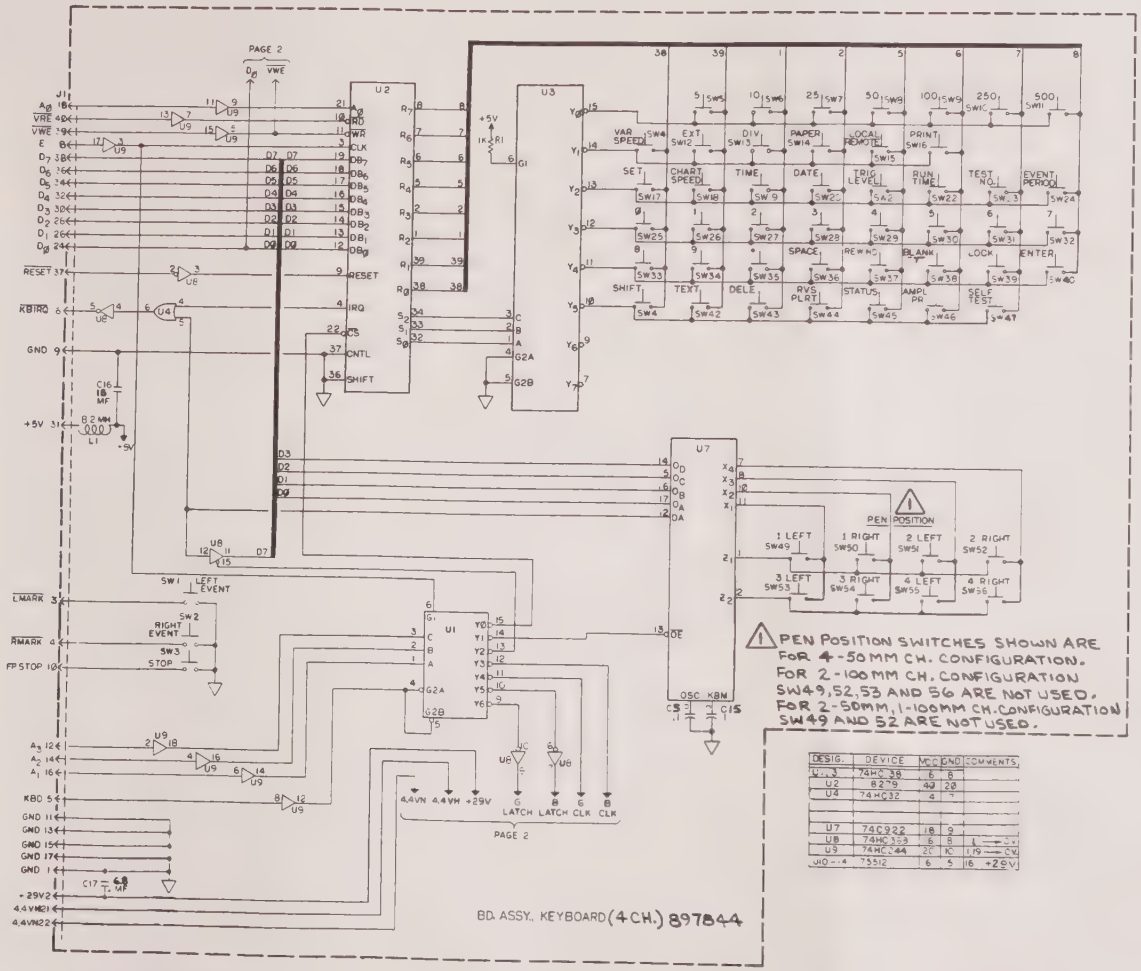
BY	DATE	NAME
CZECH	5-19-86	SCHEMATIC
L.M. Swartz	11/86	
[illegible]	11/4/86	

Gould Inc. Instruments Division Cleveland Ohio 44114 U.S.A.

CODE IDENT	ISSUE CODE	DWG. NO.
96795	G	297843
		SHT. 1 OF 2

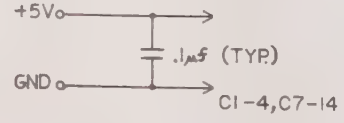
297843 1


REVISIONS
G-1
ZONE
DESCRIPTION
DATE
4.4VH
4.4VH
DATA IN
CLOCK
LATCH
U4A
U4C
U10
U11
U12
U13
U14
VFD
STROBE
SERIAL OUT
SERIAL IN
PAGE 1
VWE
G CLK
G LATCH
SCHEMATIC
Gould Inc.
Instruments Division
Cleveland, Ohio 44114 U.S.A.
CZECH
5-19-86
11/96
96795
SHT. 2 OF 2
297843



⚠ PEN POSITION SWITCHES SHOWN ARE FOR 4-50MM CH. CONFIGURATION. FOR 2-100MM CH. CONFIGURATION SW49,52,53 AND 56 ARE NOT USED. FOR 2-50MM, 1-100MM CH. CONFIGURATION SW49 AND 52 ARE NOT USED.

DESIG.	DEVICE	VCC	GND	COMMENTS
U1,3	74HC 138	16	8	
U2	8279	40	20	
U4	74HC32	14	7	
U7	74C922	18	9	
U8	74HC139	16	8	L — CH
U9	74HC244	20	10	1.19 — CH
J10-4	75512	6	5	16 +29V



NOTE: UNLESS OTHERWISE INDICATED:
ALL CAPACITANCE IN MICROFARADS.
ALL RESISTANCE IN OHMS.
ALL RESISTORS .15 WATT, 2%.

REVISIONS			
SYM	DESCRIPTION	DATE	
D	ORIGINAL RELEASE DCN 33600 SWARTZ	11-15-86	MF
E-1	REVISED PER DCN 34057/A SOTEROS	3-20-87	MF
F-1	NOT AFFECTED PER DCN 34298/A SOTEROS	6-22-87	MF
G-1	NOT AFFECTED PER DCN 34940/A SOTEROS	3-30-88	MF

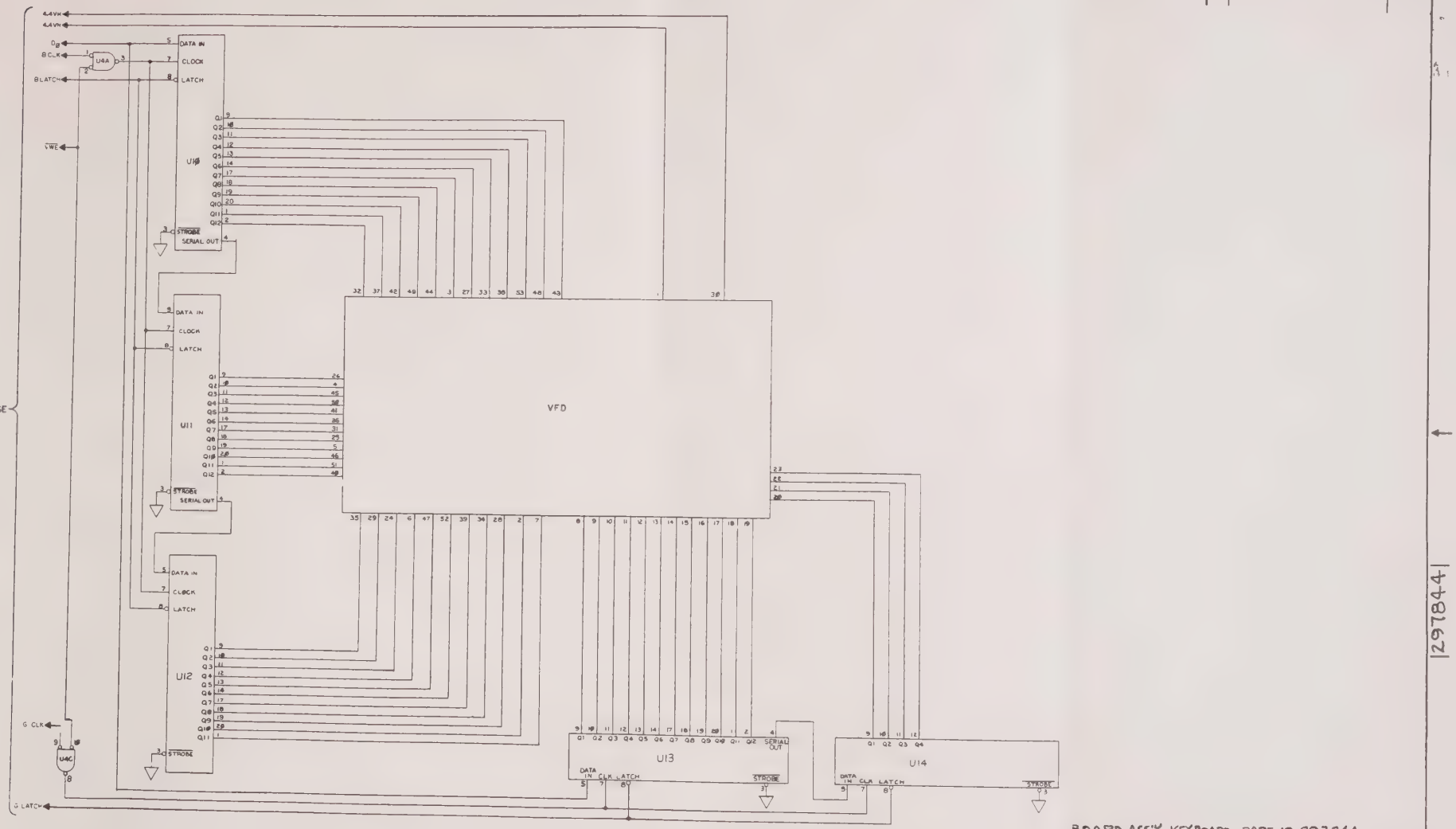
BOARD ASSY., KEYBOARD PART NO. 897844

	BY	DATE	NAME
DR	CZECH	5-19-86	SCHEMATIC
CH		11/86	
		11/86	

CODE IDENT 96795 | ISSUE CODE G

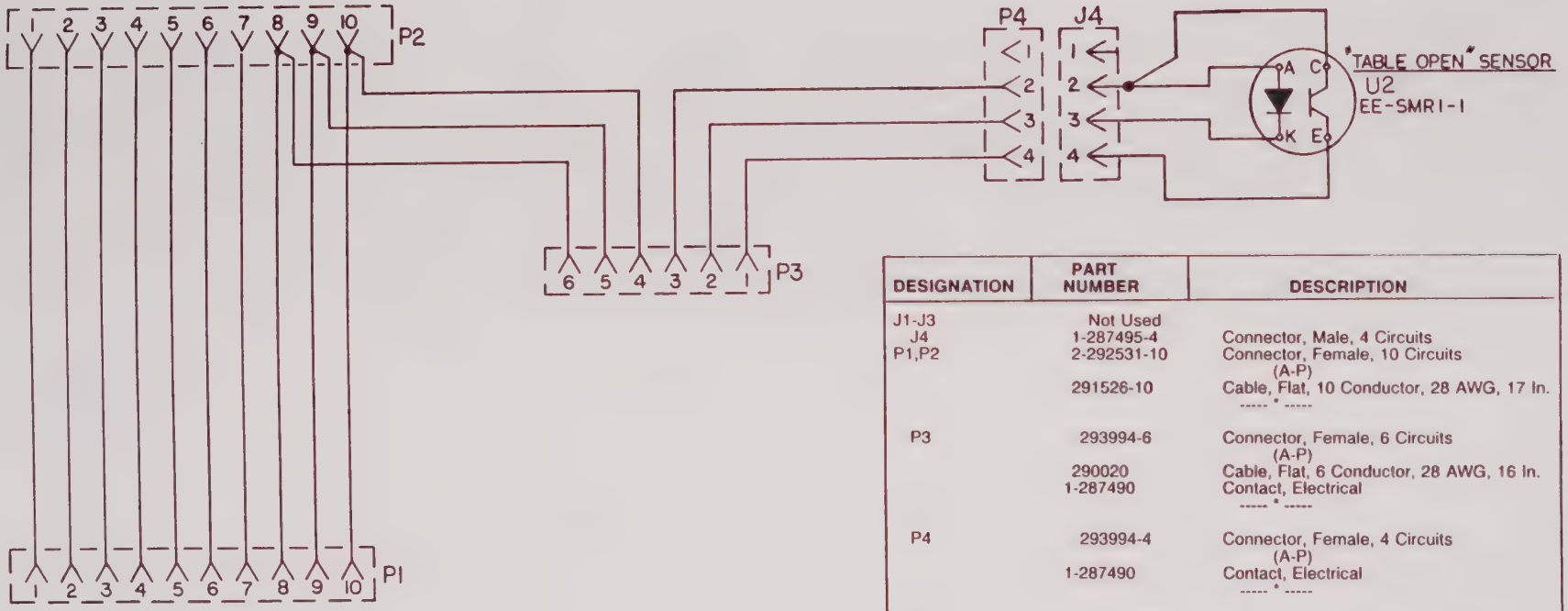
Gould Inc
Instruments Division
Cleveland Ohio 44114 U.S.A.
DWG NO 297844
SHT. 1 OF 2

297844 1


REVISIONS
G-1
BYM
DESCRIPTION
DATE
4.4VK
4.4VN
DATA IN
CLOCK
LATCH
STROBE
SERIAL OUT
U11
U12
U13
U14
U4A
U4C
VFD
PAGE 1
G CLK
G LATCH
BOARD ASS'Y, KEYBOARD PART NO. 897844
CZECH
SCHEMATIC
Gould Inc
Instruments Division
Cleveland, Ohio 44114 U.S.A.
96795
297844
SHT. 2 OF 2

REVISIONS			
SYM	DESCRIPTION	DATE	
A	REVISED PER DCN 34467	5-1-87	

PHOTO SENSOR CABLE ASSEMBLY 897912

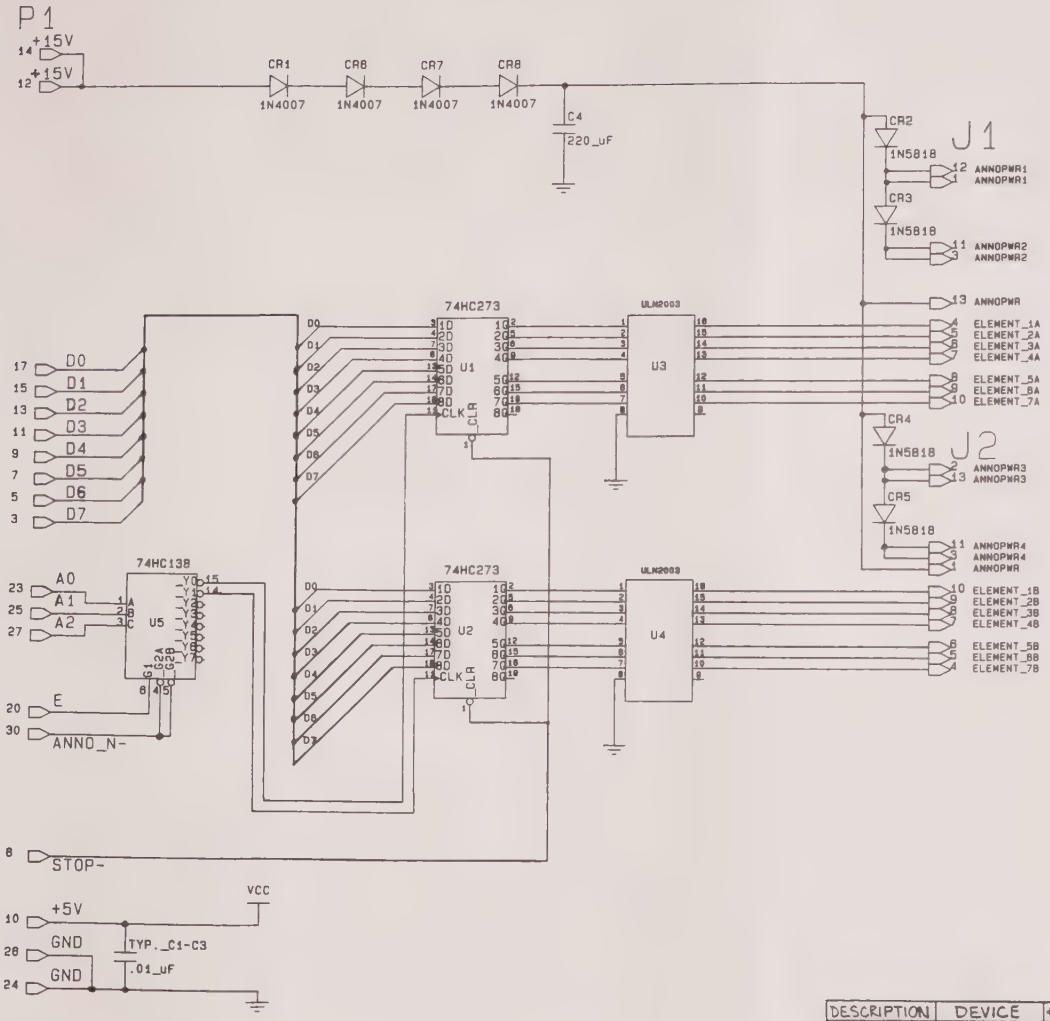


DESIGNATION	PART NUMBER	DESCRIPTION
J1-J3	Not Used	
J4	1-287495-4	Connector, Male, 4 Circuits
P1,P2	2-292531-10	Connector, Female, 10 Circuits (A-P)
	291526-10	Cable, Flat, 10 Conductor, 28 AWG, 17 In.
		----- * -----
P3	293994-6	Connector, Female, 6 Circuits (A-P)
	290020	Cable, Flat, 6 Conductor, 28 AWG, 16 In.
	1-287490	Contact, Electrical
		----- * -----
P4	293994-4	Connector, Female, 4 Circuits (A-P)
	1-287490	Contact, Electrical
		----- * -----
U1	Not Used	
U2	298042	Photo Sensor, Reflective EE-SMR1-1 (A-P)
	CL-210245	Spacer, Rubber, 0.2 In. ID, 0.5 IN. OD

CABLE ASSY., PHOTO SENSOR 897912

BY	DATE	NAME	Gould Inc. Instruments Division Cleveland, Ohio 44114 U.S.A.
CH T. KOCHIS	7-86	SCHEMATIC	
APP	11-86		SIZE 297912
ENG F. ZAFF	11-86	CODE IDENT 96795	SHEET 6

1 of 2



DESCRIPTION	DEVICE	+5V	GND
U1, U2	74HC273	20	10
U5	74HC138	16	8

REVISIONS

SYM	DESCRIPTION	DATE
E	ORIGINAL RELEASE DCN 33755 SWARTZ	12-29-86

BOARD ASS'Y., INTERCHANNEL ANNOTATION CL-810191

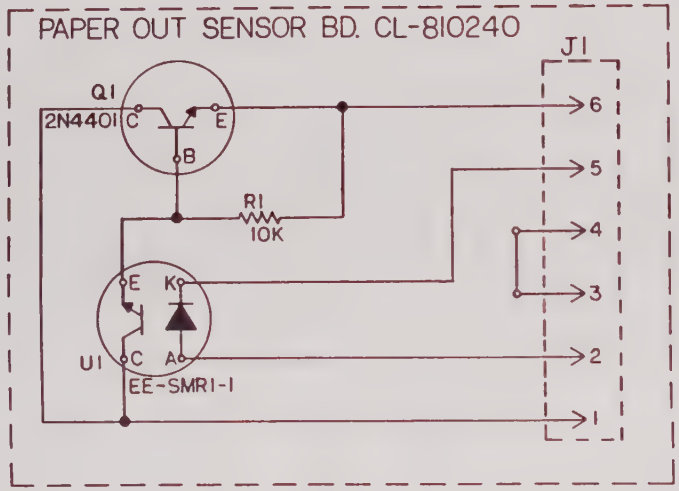
	BY	DATE	NAME
DR	KRAIZEL	10-86	SCHEMATIC
CH	D. SWARTZ	12-29-86	
APP	KRAIZEL	12-31-86	

CODE IDENT 96795 | ISSUE CODE G

Gould Inc
Instruments Division
Cleveland Ohio 44114 U.S.A.
DWG. NO. CL-210191

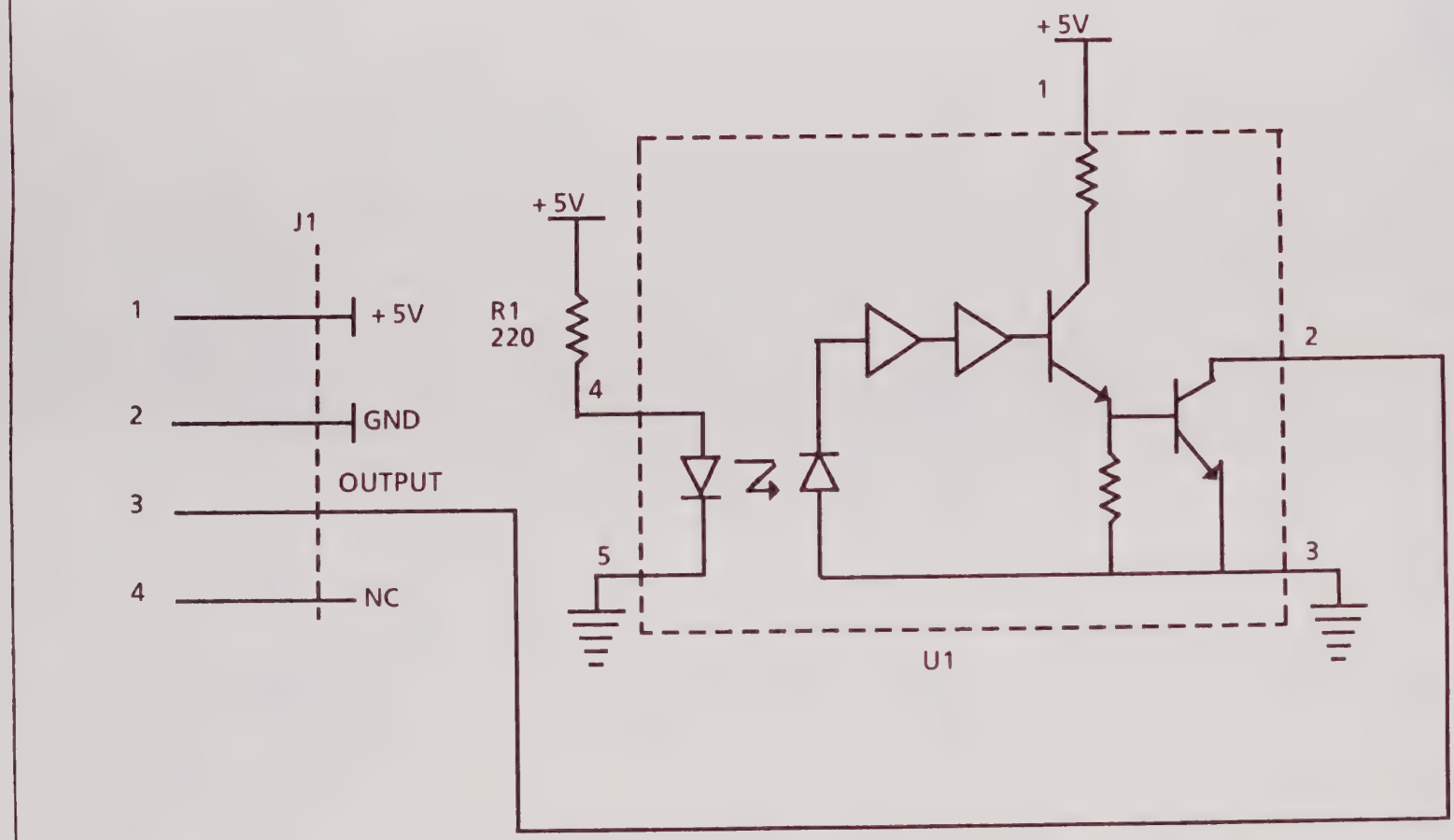
CL-210191

REVISIONS		
STM	DESCRIPTION	DATE
H	REDRAWN/NOT AFFECTED PER DCN 35161/A SOTEROS	8-15-88



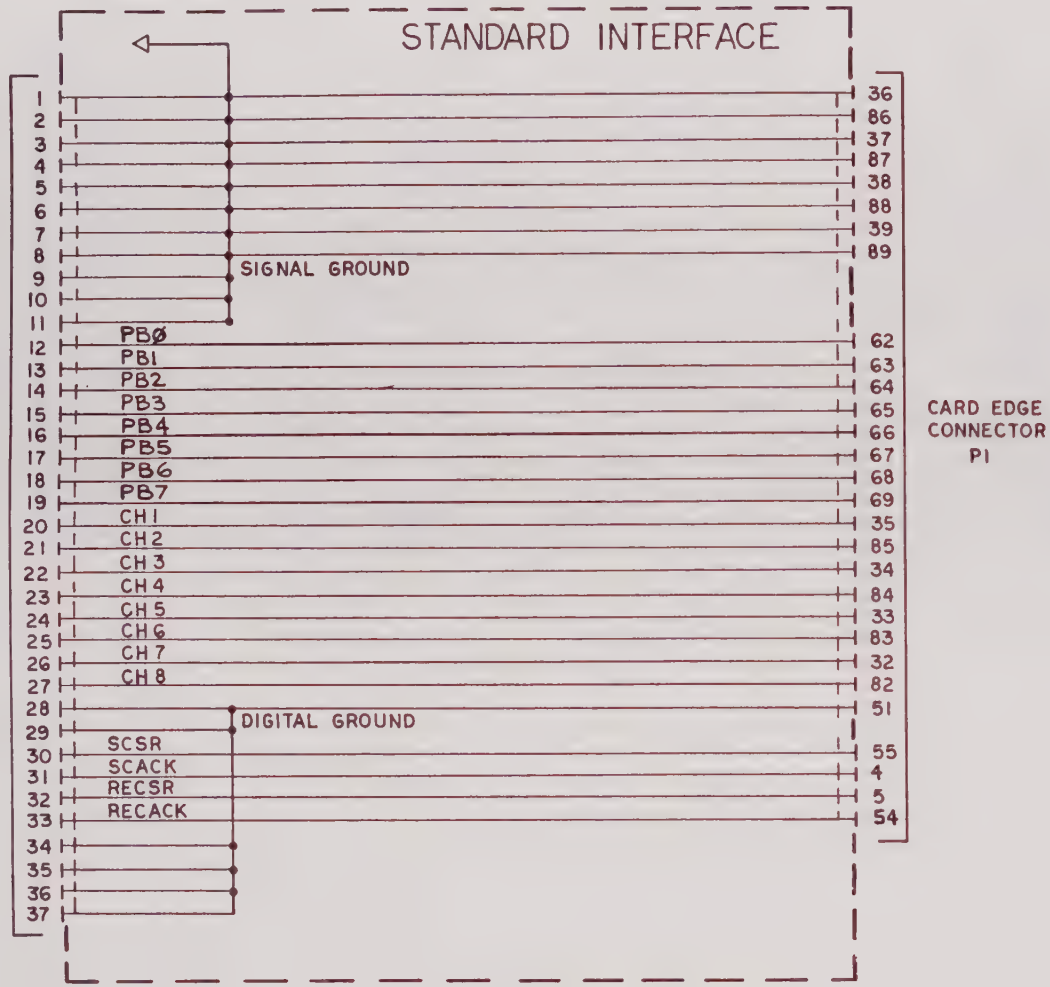
BOARD ASS'Y.. PAPER OUT SENSOR CL-810240

BY	DATE	SCHEMATIC	GOULD INC RECORDING SYS DIV Cleveland, Ohio 44114 U.S.A.	
DR KOCHIS	8-28-86			
CH SWARTZ	11-86	CODE IDENT 06766	SIZE G	DWG NO CL-210240
APP ZAFFARANO	11-86		CODE	



BOARD ASSY., SPEED MONITOR CL-810290

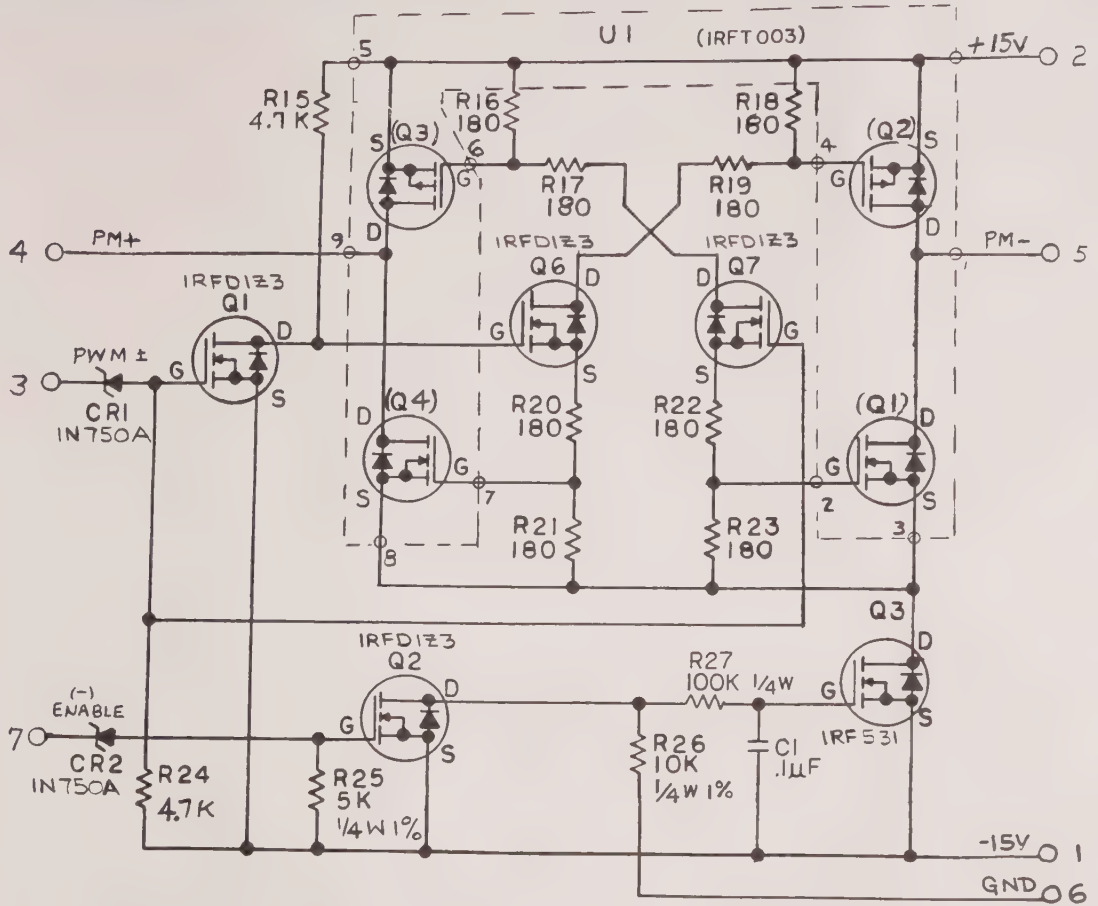
SCHEMATIC DWG. NO. CL-210290

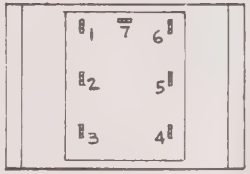


REVISIONS		
SYM	DESCRIPTION	DATE
B	ORIGINAL RELEASE DCN 33710 SWARTZ	12-18-86
C	NOT AFFECTED DCN 33828 CLARK	2-10-87
D-1	NOT AFFECTED PER DCN 34168/A SOTEROS	5-4-87
E	NOT AFFECTED PER DCN 35122 KISNER	8-30-88
F	NOT AFFECTED PER DCN 35376 KISNER	12-12-88

BOARD ASS'Y, STANDARD INTERFACE CL-810312

DR C. Brennan	7-15-86	SCHEMATIC	Gould Inc. Instruments Division Cleveland, Ohio 44114 U.S.A.
CH Dwan	11/86	CODE IDENT 96795	DWG NO CL-210312
AP	12/86	ISSUE CODE G	





TERMINAL NUMBERING VIEWED FROM TERMINAL SIDE.

REVISIONS		
SYM	DESCRIPTION	DATE
A-1	ORIGINAL RELEASE	JONES 4-24-86
B	Q1, Q2, Q3, Q4 SYMBOL CHGD; ADDED R27, C1 DCN 33570 J. KOCHIS	3-10-87
C	C1 WAS TO GND DCN 34490 SWARTZ	8-15-87

2. UNLESS OTHERWISE INDICATED:
ALL RESISTANCE IN OHMS.
ALL RESISTORS 1/2 W, 5%

1. "Q" NUMBERS IN ( ) ARE VENDOR IDENTIFICATION INSIDE U1 PACKAGE.

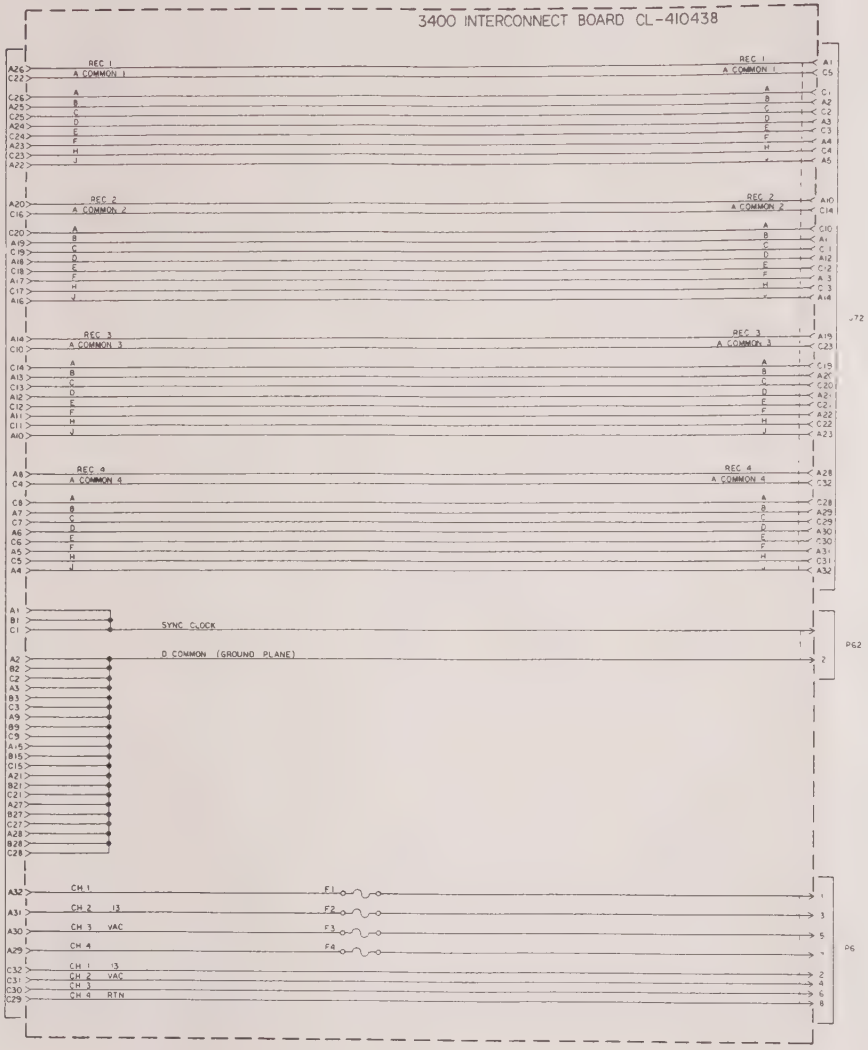
NOTES:

BOARD ASSY, PEN SERVO OUTPUT CL-810380

BY	DATE	NAME		
DR C. JONES	4-24-86	SCHEMATIC	Gould Inc Instruments Division Cleveland, Ohio 44114 U.S.A.	
DES P. ZECH	4-24-86	CODE IDENT 96795	ISSUE CODE G	DWG NO CL-210380
APP P. BAFF	4/25/86			

CL-210380

REVISIONS		
SYM	DESCRIPTION	DATE
D	ORIGINAL RELEASE DCN 33723 SWARTZ	12-13-86



BOARD ASS'Y., INTERCONNECT CL-810438

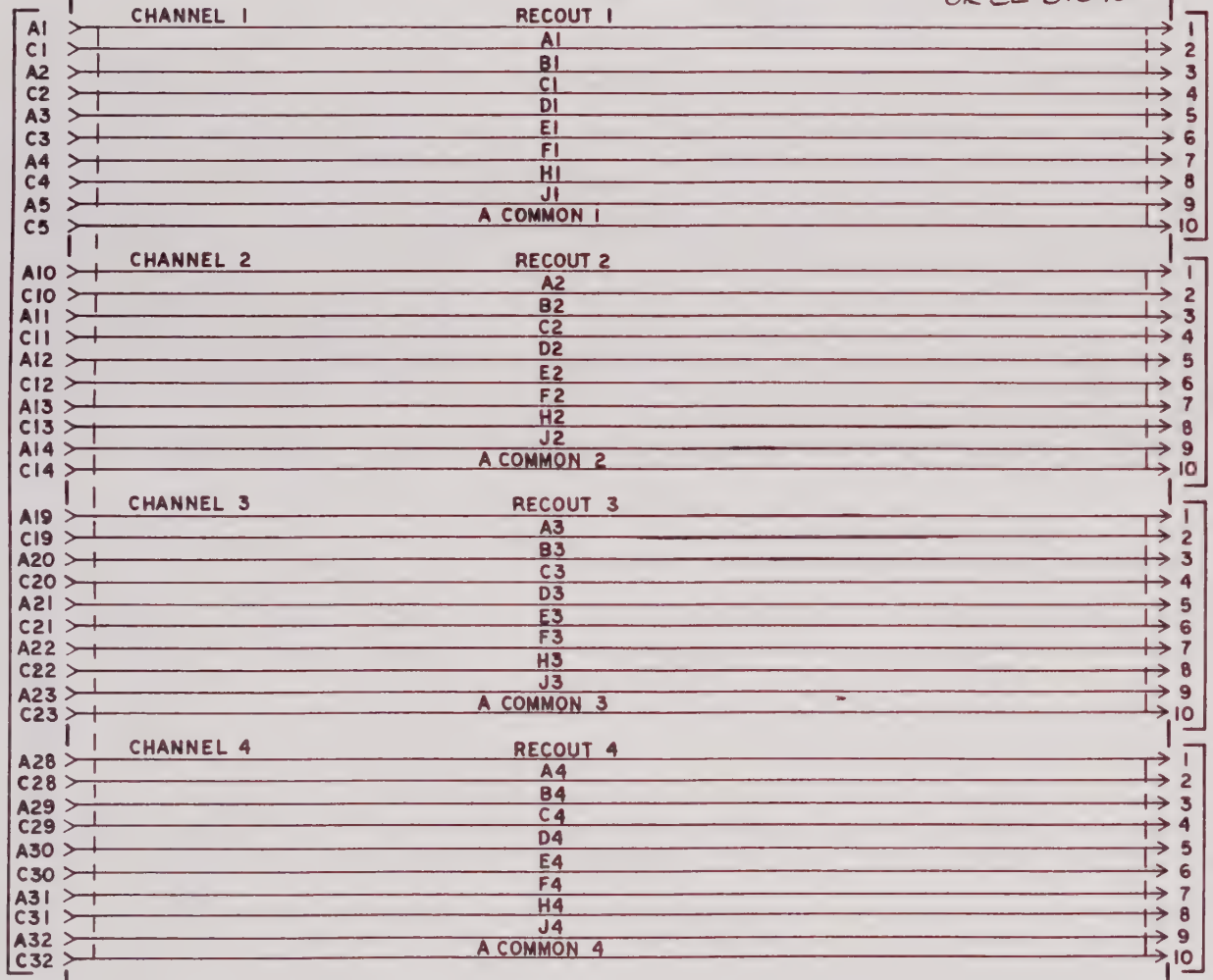
BY	DATE	NAME		
DR KOCHIS	11-86	SCHEMATIC	Gould Inc. Instruments Division Cleveland Ohio 44114 U.S.A.	
	12-86			
	1/2/87	CODE IDENT 96795	ISSUE CODE G	DWG. NO. CL-210438

CL-210438

BOARD ASSY., MEDICAL OUTPUT

CL-810439
OR CL-810439-1

REVISIONS			
DTR	DESCRIPTION		DATE
B	ORIGINAL RELEASE DCN 33604 SWARTZ		11-11-86
C	REVISED PER DCN 34785 KILGORE		3-1-88
D	NOT AFFECTED PER DCN 35367 W1		7/9/88



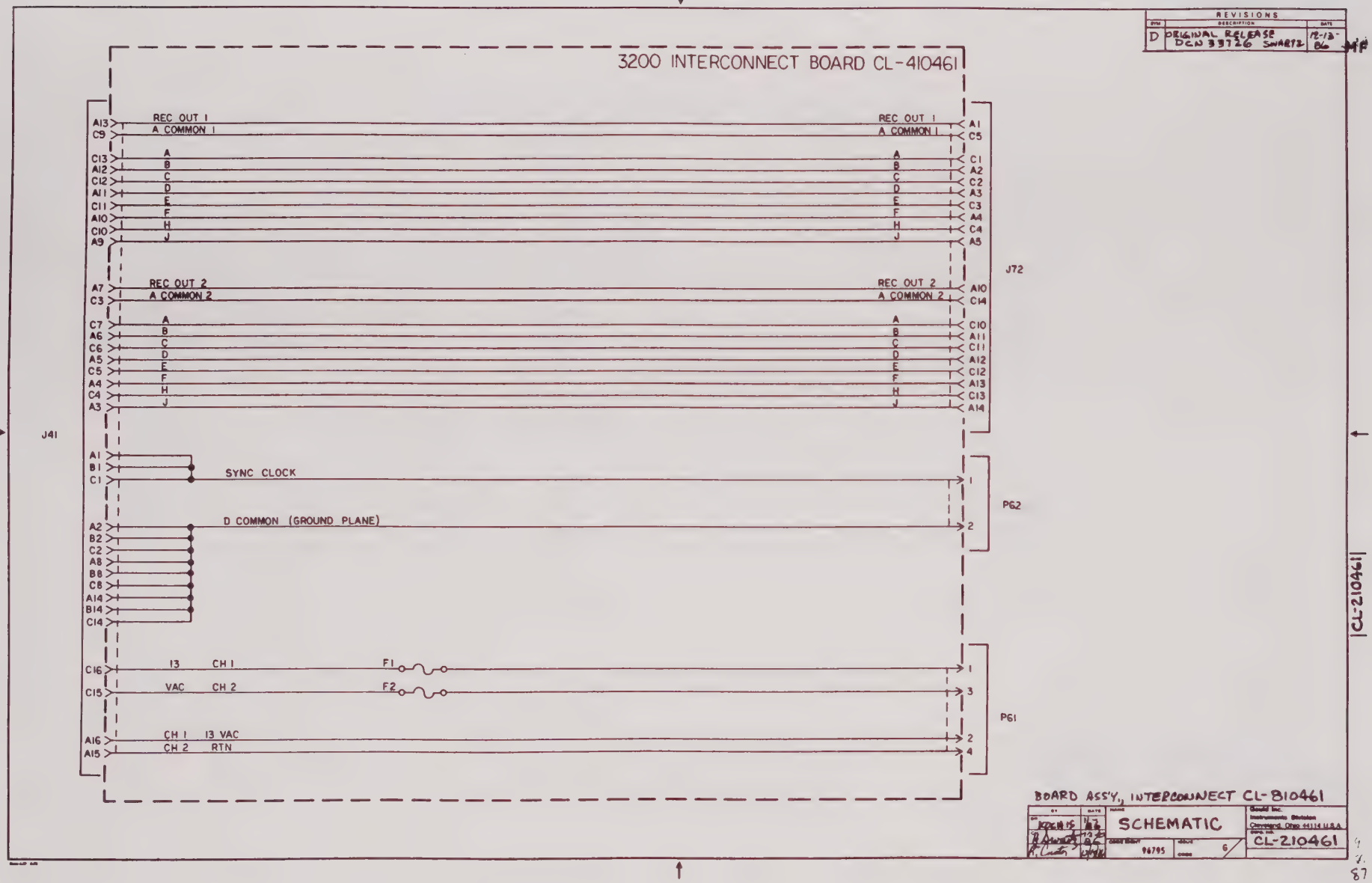
BOARD ASSY., MEDICAL OUTPUT

SCHEMATIC

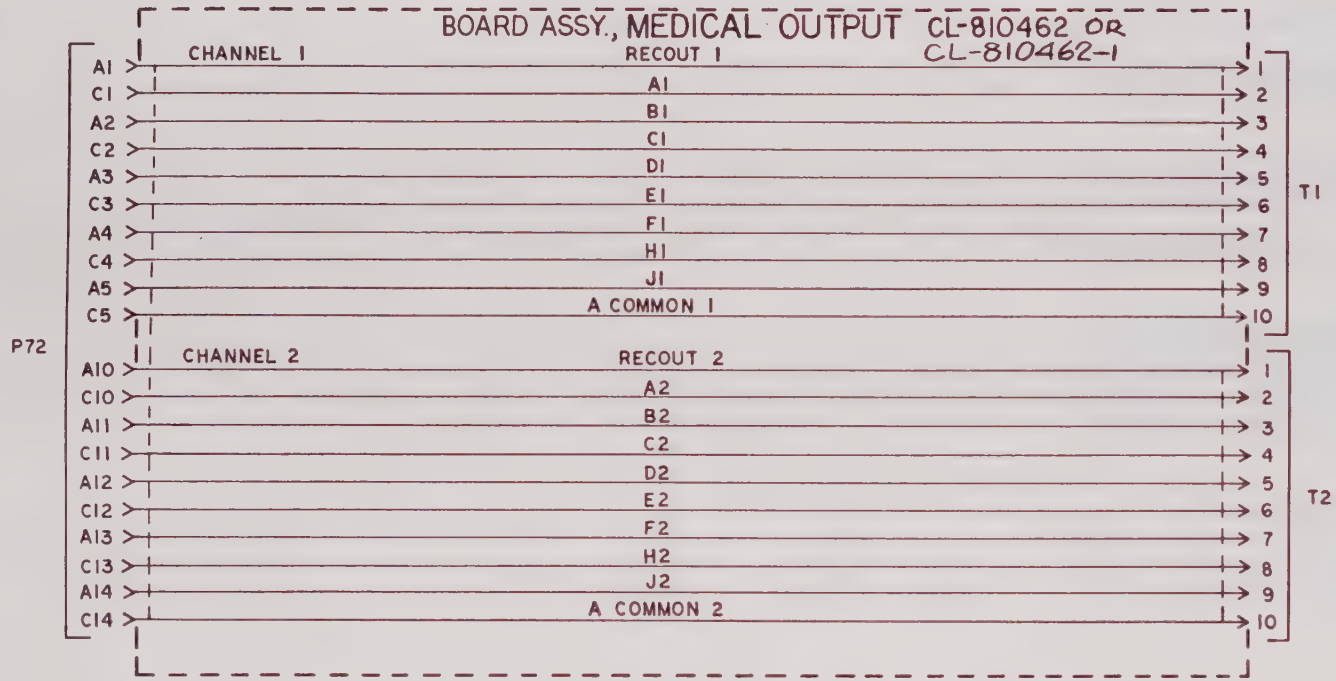
Gould Inc.
Instruments Division
Cleveland, Ohio 44114 U.S.A.

CL-210439

96795


3200 INTERCONNECT BOARD CL-410461
REVISIONS
D ORIGINAL RELEASE DCN 33726 SW4872 12-12-86
REC OUT 1
A COMMON 1
REC OUT 2
A COMMON 2
J72
J41
P62
P61
SYNC CLOCK
D COMMON (GROUND PLANE)
13 CH 1
VAC CH 2
F1
F2
CH 1 13 VAC
CH 2 RTN
BOARD ASS'Y, INTERCONNECT CL-810461
SCHEMATIC
CL-210461
CL-210461

REVISIONS		
LTR	DESCRIPTION	DATE
B	ORIGINAL RELEASE DCN 35053 SUM RTZ	11-10-87
C	REVISED PER DCN 34786 RICOH	3-31-88
D	NOT AFFECTED PER DCN 35380/WT	12/9/88



BOARD ASSY, MEDICAL OUTPUT

SCHEMATIC

Gould Inc
Instruments Division
Cleveland, Ohio 44114 U.S.A.

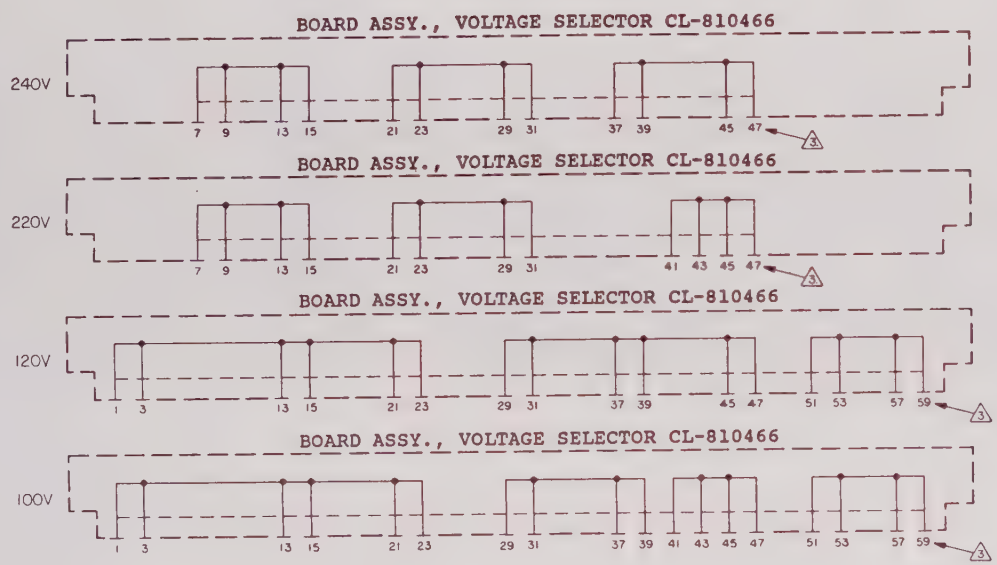
CL-210462

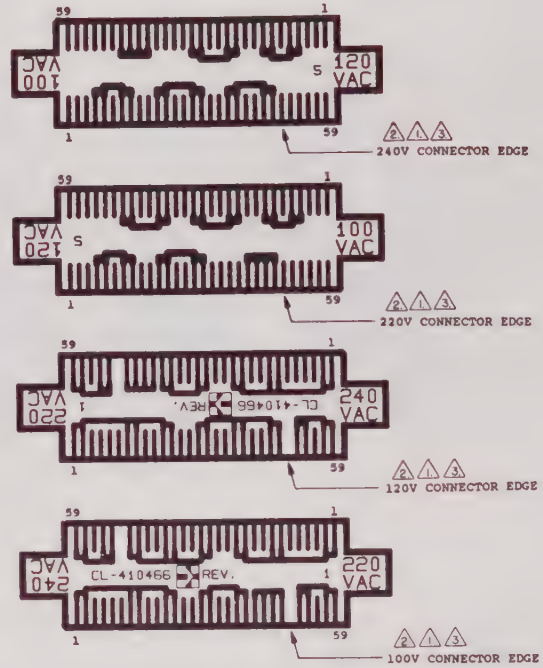
CODE IDENT 96795

SIZE G

CODE

REVISIONS			
SYM	DESCRIPTION		DATE
D	ORIGINAL RELEASE ISSUE DCN 34236 J. KOCHIS		5-28-87 MF





3. PIN NUMBERS SHOWN ARE ON THE MATING CONNECTOR AND ARE SHOWN HERE FOR REFERENCE ONLY.

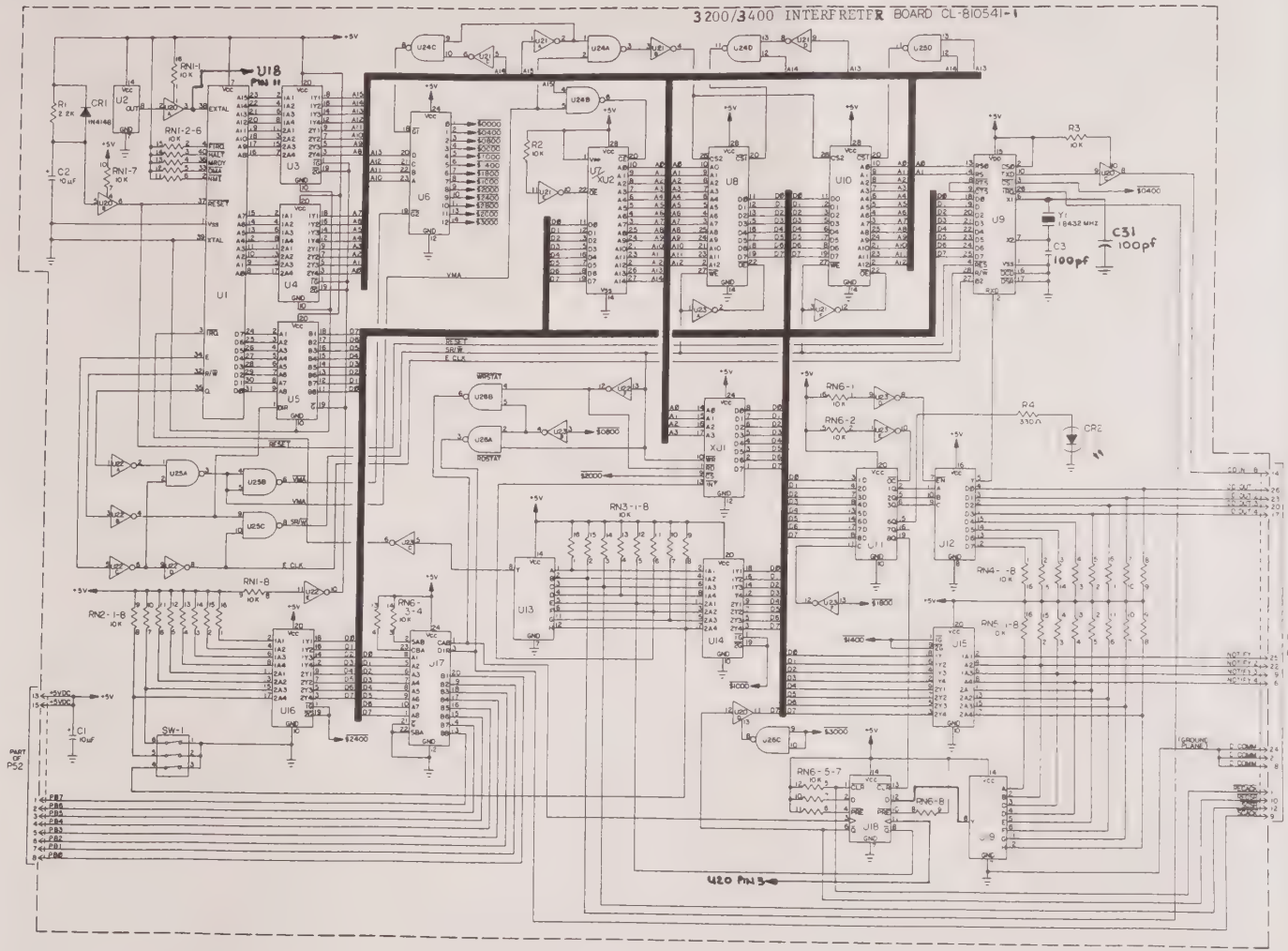
2. SILKSCREEN VOLTAGE NUMBERS (100VAC,120VAC,220VAC,240VAC) CORROSPONDING TO THE CONNECTOR EDGES ARE ON THE REVERSE SIDE OF THE P.C. BOARD.

1. P.C. BOARD SHOWN FOR REFERENCE ONLY.

NOTES:

BOARD ASSY.,VOLTAGE SELECTOR CL-810466

BY J. KOCHIS 5-27-87	NAME SCHEMATIC	Gould Inc. Instruments Division Cleveland Ohio 44114 U.S.A.	
CK 5-27-87			
APP'D 5-28-87	CAGE IDENT 96795	ISSUE CODE G	DWG NO CL-210466



REVISIONS			
SYM	DESCRIPTION		DATE
D	ORIGINAL RELEASE DCN 33758	SWARTZ	12-29-86
E	REVISED PER DCN 34223	CLARK	6-8-87
F	REVISED PER DCN 34792	CLARK	2-24-88

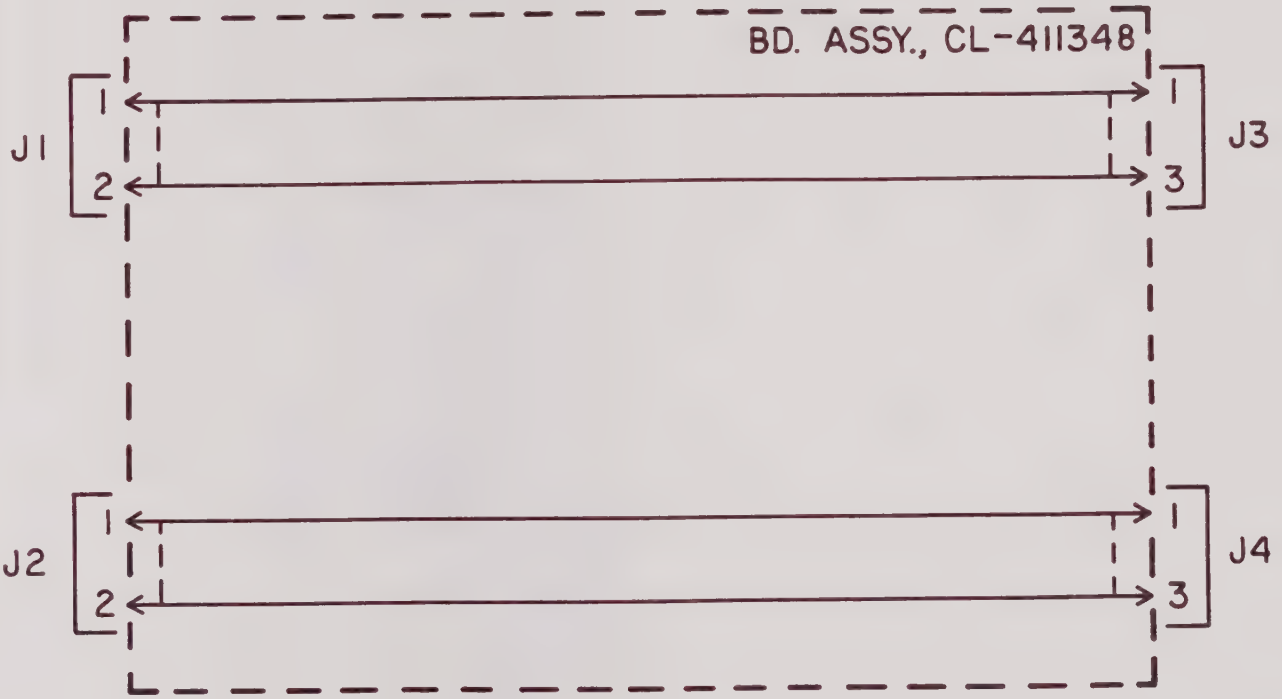
MF

BOARD ASS'Y, INTERPRETER 3200/3400 CL-810541-1

	DATE	NAME	
DR KOCHIS	12-8/6	SCHEMATIC	Gould Inc. Instruments Division Cleveland, Ohio 44114 U.S.A.
CH	12-29-86		
APP	1/4/87		
CODE IDENT 96795	ISSUE CODE F	DWG. NO. CL-210541	

CL-210541

REVISIONS		
SYM	DESCRIPTION	DATE
A	ORIGINAL RELEASE ISSUE	2-13-87
B	NOT AFFECTED PER DCN 34040 KILOCQS	3-18-87



DESIGNATION	PART NUMBER	DESCRIPTION
J1,J2	293983-2	Connector 2 pin
J3,J4	293983-3	Connector 3 pin
	249438-13	Spacer/Standoff
	CL-610876	Modified Strip

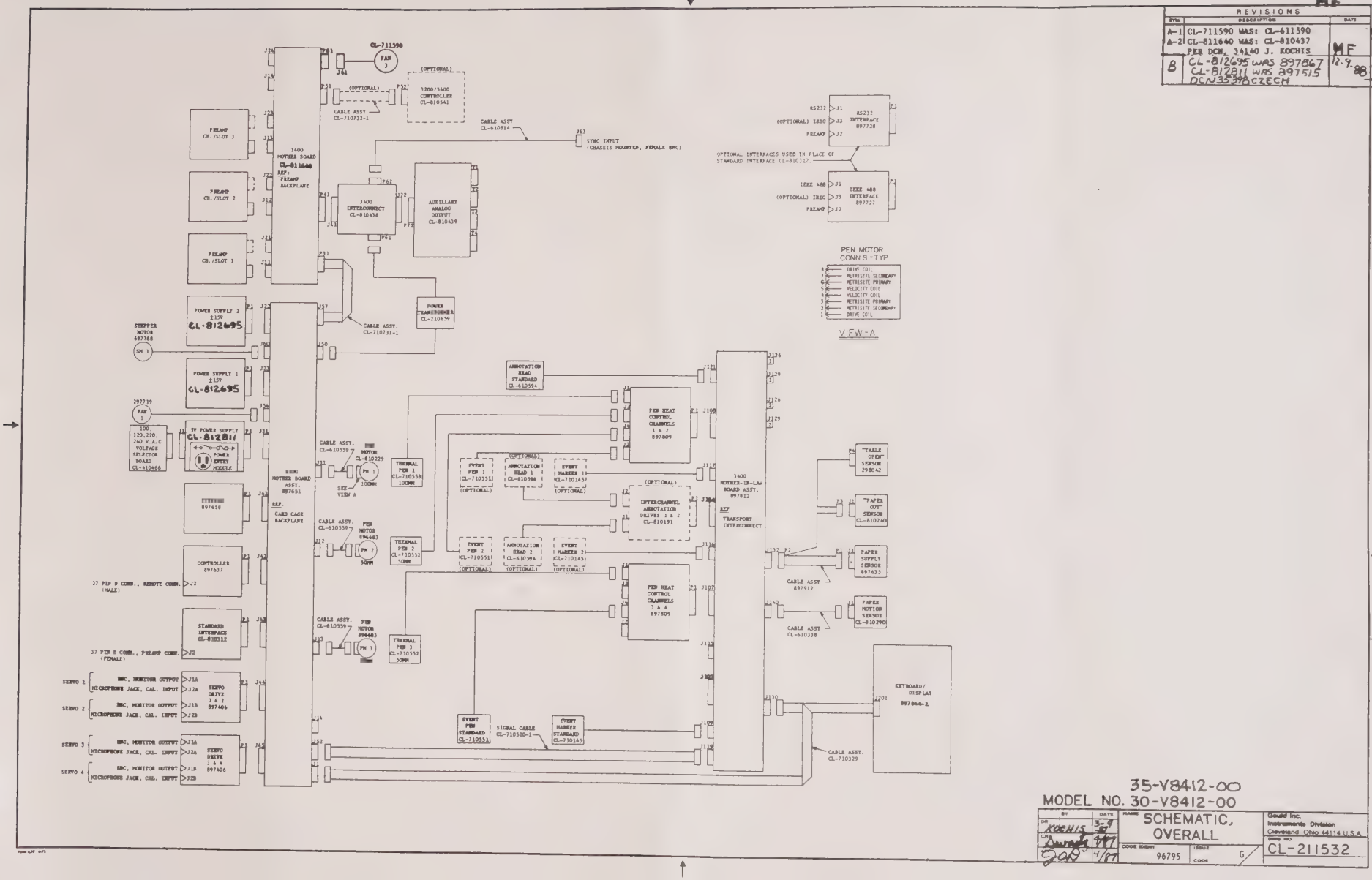
BOARD ASSY., PEN LEAD RETAINER CL-411348

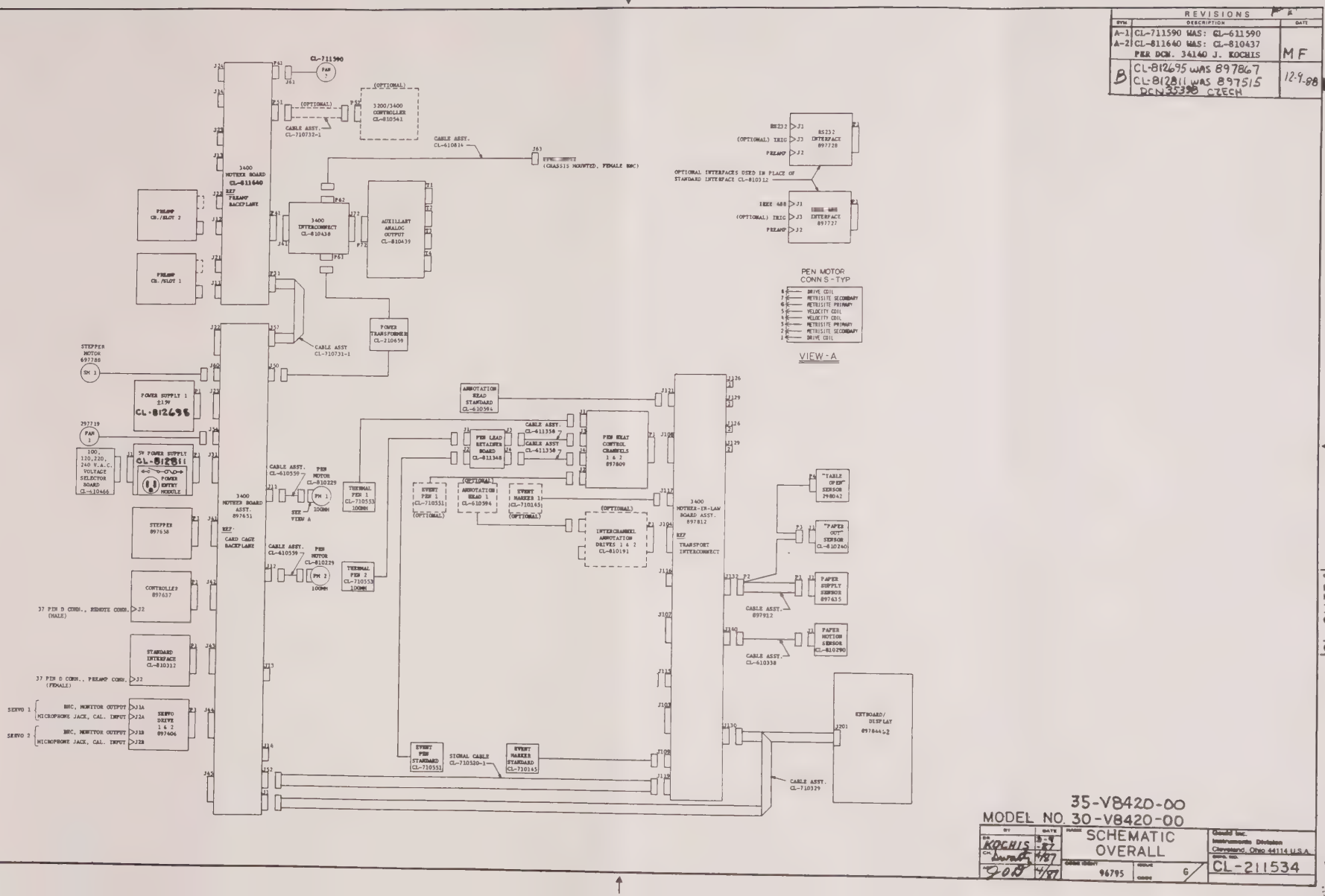
BY	DATE
DR [illegible]	2-6-87
E. Gaske	2-6-87
P. Olin	2-6-87

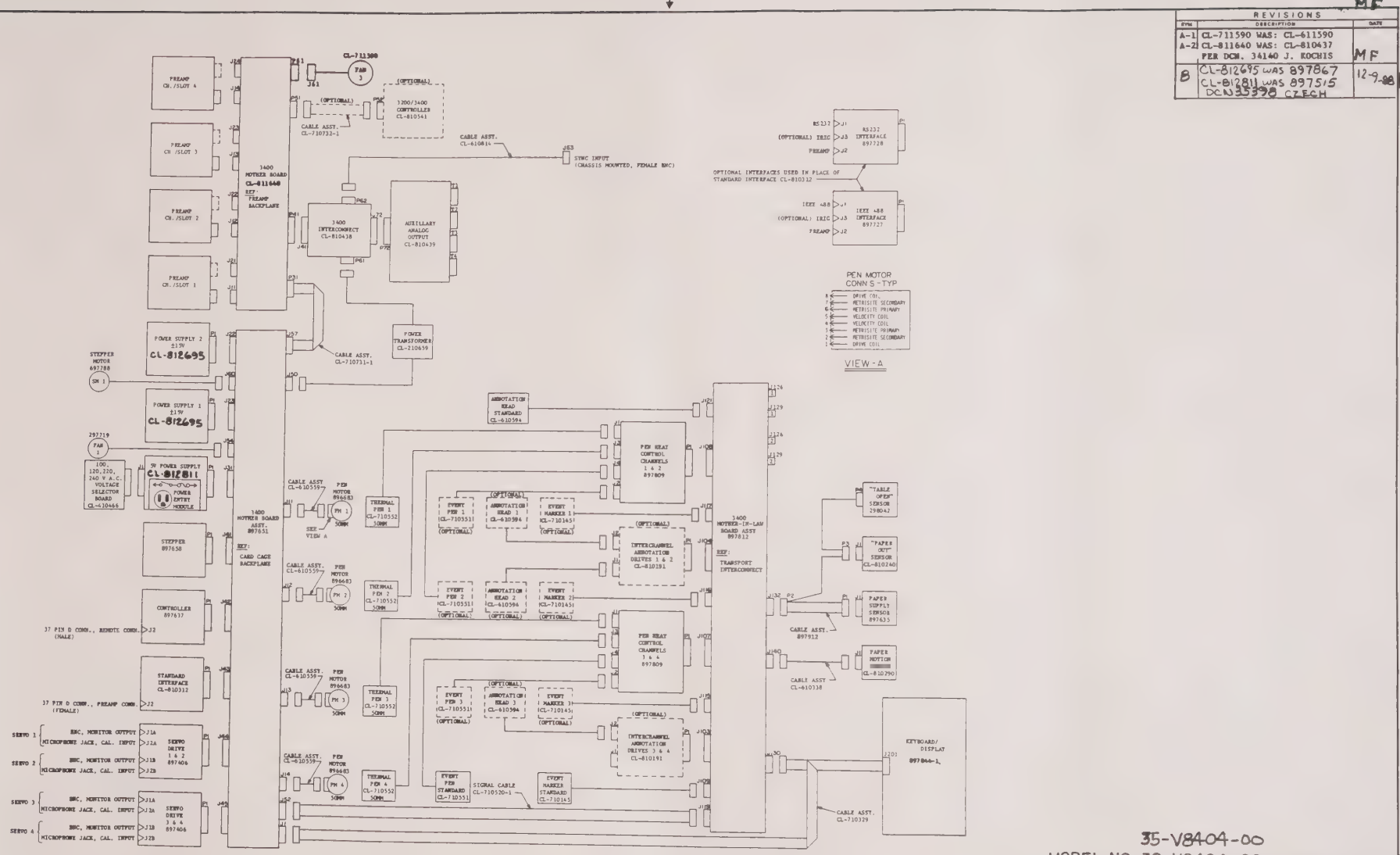
SCHEMATIC

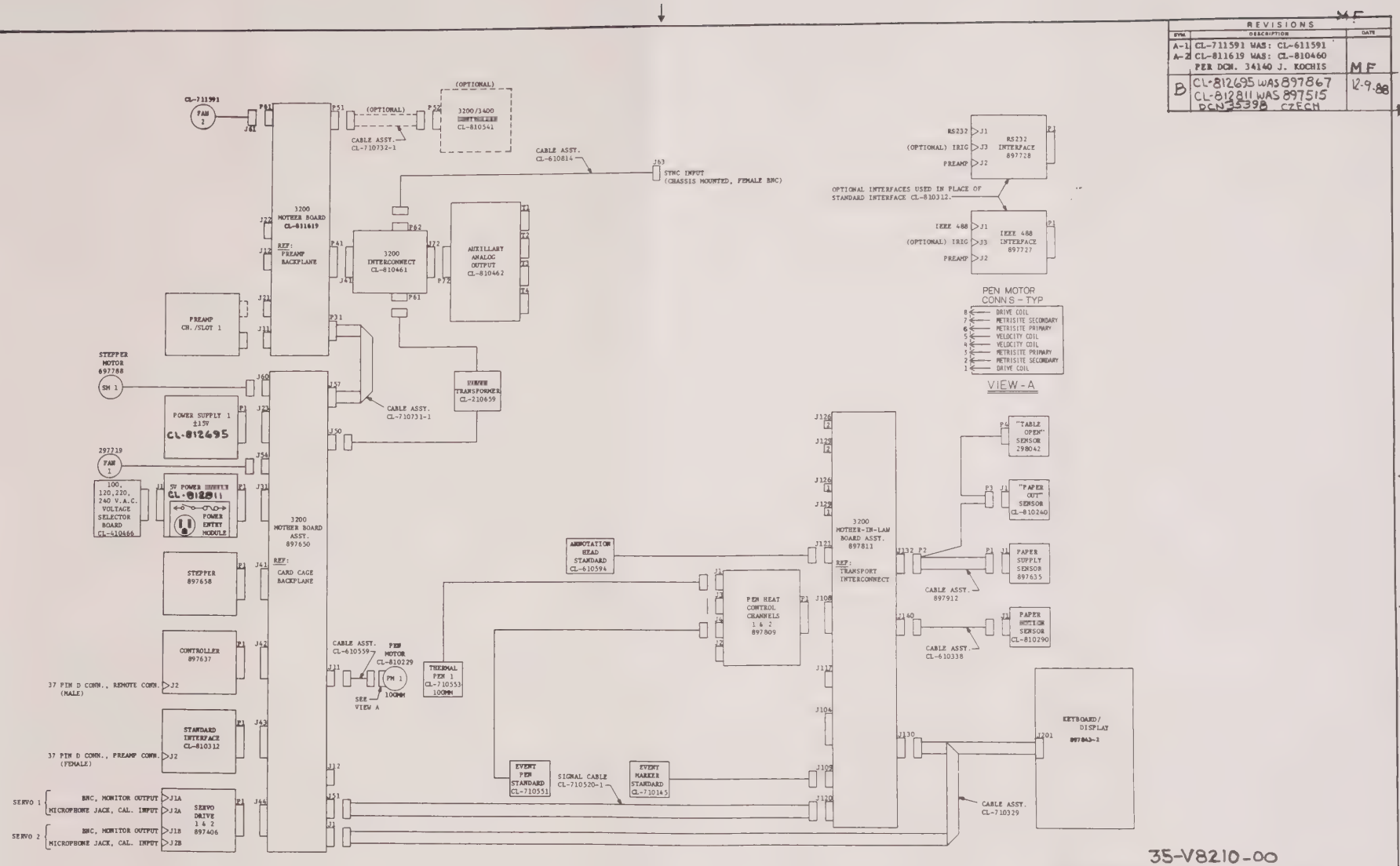
CODE IDENT. 96795 | ISSUE CODE G

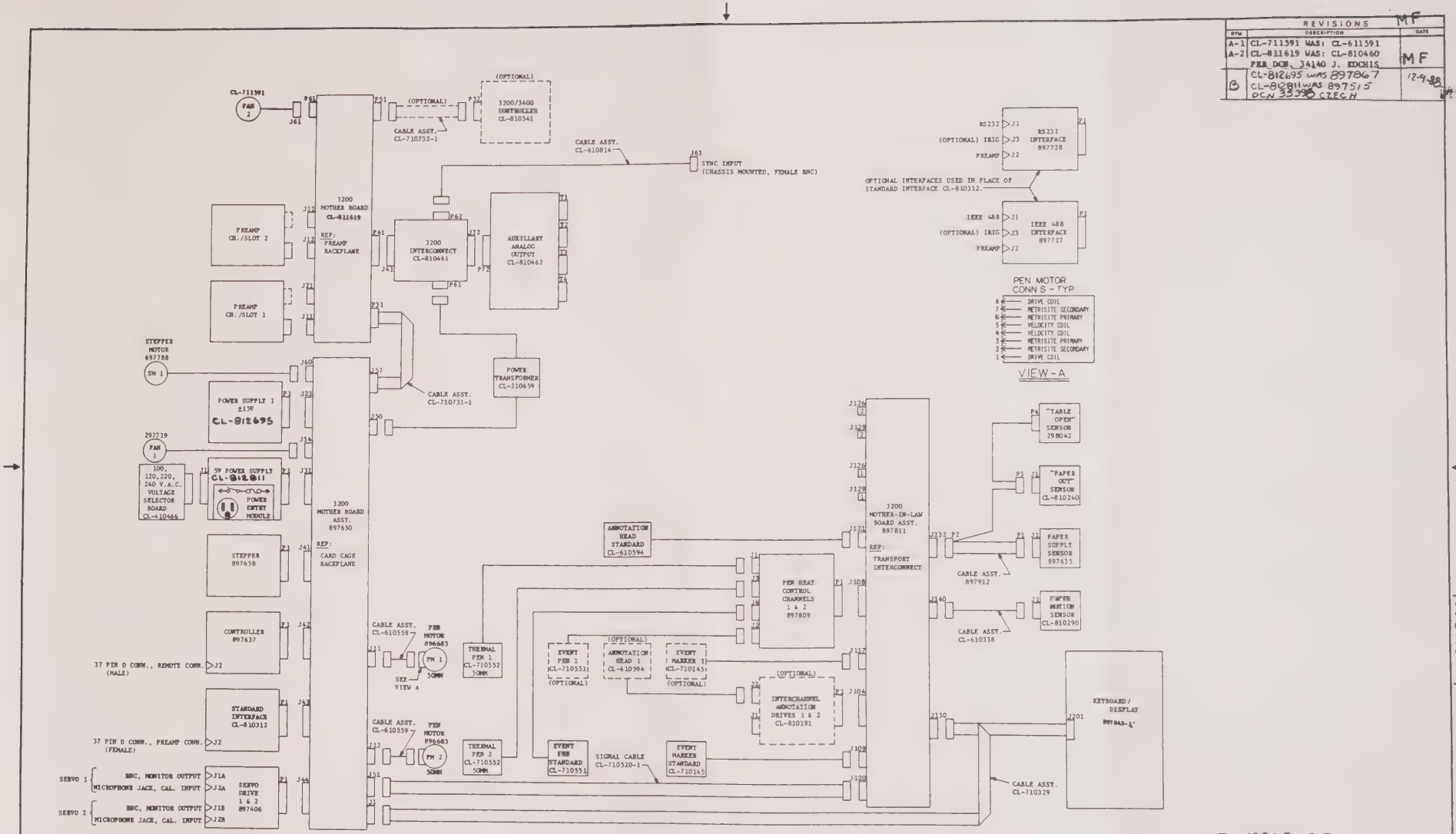
Gould Inc.
Instruments Division
Cleveland, Ohio 44114 U.S.A.
DWG. NO. CL-211348

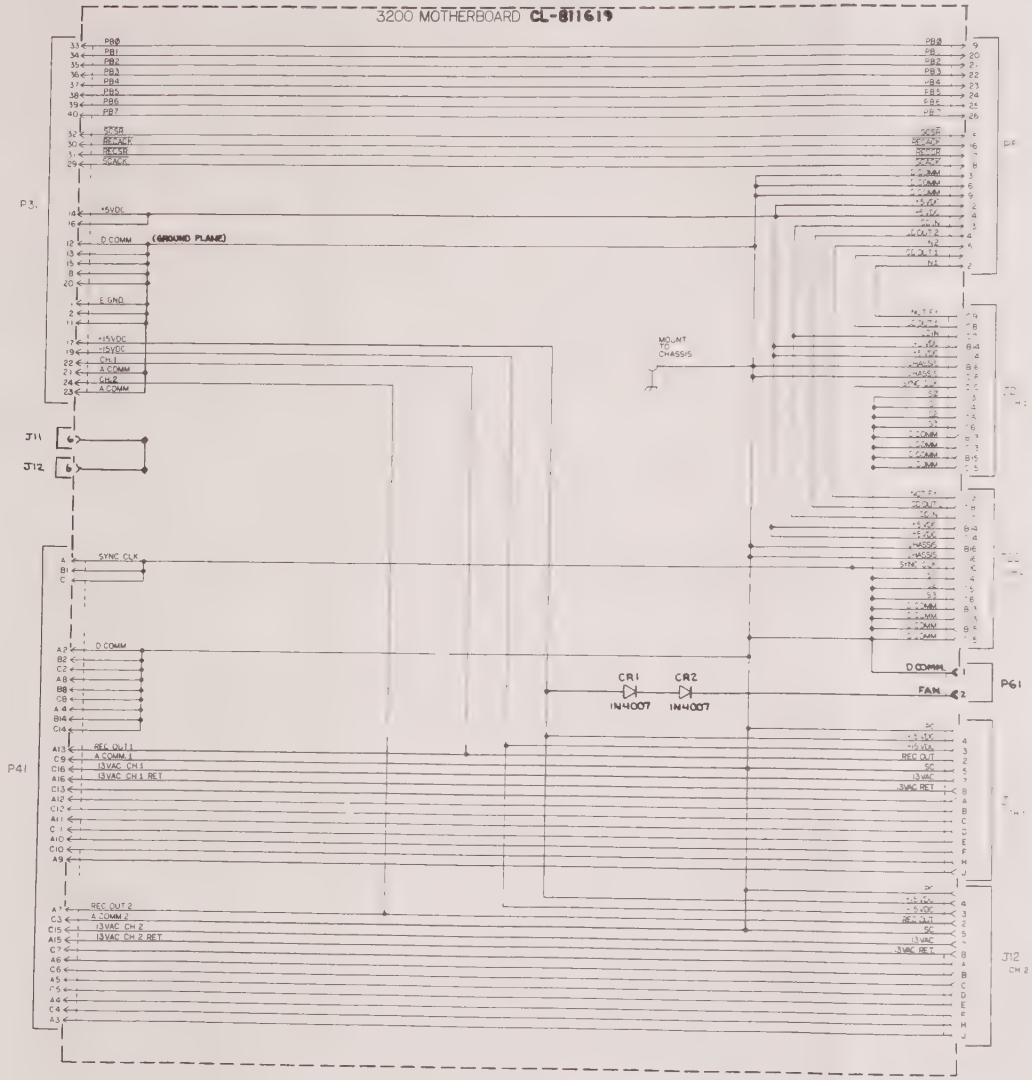

REVISIONS
REVN. DESCRIPTION DATE
A-1 CL-711590 WAS: CL-611590
A-2 CL-811640 WAS: CL-810437
PER DCN. 34140 J. KOCHIS
B CL-812695 WAS 897867
CL-812811 WAS 897515
DCN35970CTECH
12-9-88
CL-711590
FAN 3
(OPTIONAL)
3200/3400 CONTROLLER CL-810341
CABLE ASST CL-710732-1
CABLE ASST CL-610814
SYNC INPUT (CHASSIS MOUNTED, FEMALE BNC)
3400 MOTHER BOARD CL-811640
REF: PREAMP BACKPLANE
PREAMP CH./SLOT 3
PREAMP CH./SLOT 2
PREAMP CH./SLOT 1
3400 INTERCONNECT CL-810438
AUXILLIARY ANALOG OUTPUT CL-810439
RS232 J1
(OPTIONAL) IEEE J3
PREAMP J2
RS232 INTERFACE 897728
OPTIONAL INTERFACES USED IN PLACE OF STANDARD INTERFACE CL-810312
IEEE 488 J1
(OPTIONAL) IRIG J3
PREAMP J2
IEEE 488 INTERFACE 897727
PEN MOTOR CONNS - TYP
DRIVE COIL
RETRISITE SECONDARY
RETRISITE PRIMARY
VELOCITY COIL
VELOCITY COIL
RETRISITE PRIMARY
RETRISITE SECONDARY
DRIVE COIL
VIEW-A
POWER SUPPLY 2 ±15V CL-812695
POWER TRANSFORMER CL-210699
CABLE ASSY. CL-710731-1
STEPPER MOTOR 697388
SM 1
POWER SUPPLY 1 ±15V CL-812695
292739 FAN 1
100, 120, 220, 240 V.A.C VOLTAGE SELECTOR BOARD CL-810466
5V POWER SUPPLY CL-812811
POWER ENTRY MODULE
897658
CONTROLLER 897637
37 PIN D CONN., REMOTE CONN. (MALE) J2
STANDARD INTERFACE CL-810312
37 PIN D CONN., PREAMP CONN. (FEMALE)
SERVO 1 BNC, MONITOR OUTPUT J1A
MICROPHONE JACK, CAL. INPUT J2A
SERVO 2 BNC, MONITOR OUTPUT J1B
MICROPHONE JACK, CAL. INPUT J2B
SERVO DRIVE 1 & 2 897406
SERVO 3 BNC, MONITOR OUTPUT J1A
MICROPHONE JACK, CAL. INPUT J2A
SERVO 4 BNC, MONITOR OUTPUT J1B
MICROPHONE JACK, CAL. INPUT J2B
SERVO DRIVE 3 & 4 897406
XENO MOTHER BOARD ASSY. 897651
CARD CAGE BACKPLANE
CABLE ASSY. CL-610559
PEN MOTOR CL-810229
PM 1
SIZE VIEW A
100MM
TERMINAL PEN 1 CL-710553 100MM
CABLE ASSY. CL-610559
PEN MOTOR 896683
PM 2
50MM
TERMINAL PEN 2 CL-710552 50MM
CABLE ASSY. CL-610559
PEN MOTOR 896683
PM 3
TERMINAL PEN 3 CL-710552 50MM
ANNOTATION HEAD STANDARD CL-610594
PEN HEAT CONTROL CHANNELS 1 & 2 897809
EVENT PEN 1 CL-710551
(OPTIONAL)
ANNOTATION HEAD 1 CL-610594
EVENT MARKER 1 CL-710145
INTERCHANNEL ANNOTATION DRIVES 1 & 2 CL-810191
EVENT PEN 2 CL-710551
ANNOTATION HEAD 2 CL-610594
EVENT MARKER 2 CL-710145
PEN HEAT CONTROL CHANNELS 3 & 4 897809
EVENT PEN STANDARD CL-710551
SIGNAL CABLE CL-710520-1
EVENT MARKER STANDARD CL-710145
3400 MOTHER-IN-LAW BOARD ASSY. 897812
REF TRANSPORT INTERCONNECT
"TABLE OPEN" SENSOR 298042
"PAPER OUT" SENSOR CL-810240
PAPER SUPPLY SENSOR 897633
PAPER MOTION SENSOR CL-810290
CABLE ASST 897912
CABLE ASST CL-610338
KEYBOARD/ DISPLAY 897864-2
CABLE ASST. CL-710329
35-V8412-00
MODEL NO. 30-V8412-00
BY KOCHIS
DATE 3-9-89
CHK Dunnagan 3-9-89
APP'D [illegible] 4/1/89
NAME SCHEMATIC, OVERALL
Gould Inc. Instruments Division Cleveland, Ohio 44114 U.S.A.
CODE IDENT 96795
ISSUE CODE G
DWG. NO. CL-211532
CL-211532


REVISIONS
SYM | DESCRIPTION | DATE
A-1 CL-711590 WAS: CL-611590
A-2 CL-811640 WAS: CL-810437
PER DCN. 34140 J. KOCHIS MF
B CL-812695 WAS 897867
CL-812811 WAS 897515
DCN 35398 CZECH 12-9-88 MF
CL-711590
3400 MOTHER BOARD CL-811640
REF TRIAMP BACKPLANE
PREAMP CH./SLOT 2
PREAMP CH./SLOT 1
(OPTIONAL)
3200/3400 CONTROLLER CL-810541
CABLE ASST. CL-710732-1
CABLE ASSY. CL-610814
(CHASSIS MOUNTED, FEMALE BNC)
3400 INTERCONNECT CL-810438
AUXILLARY ANALOG OUTPUT CL-810439
RS232
(OPTIONAL) TRIG
PREAMP
85232 INTERFACE 897728
OPTIONAL INTERFACES USED IN PLACE OF STANDARD INTERFACE CL-810312
IEEE 488
(OPTIONAL) TRIG
PREAMP
IEEE 488 INTERFACE 897727
PEN MOTOR CONN S - TYP
DRIVE COIL
METRISITE SECONDARY
METRISITE PRIMARY
VELOCITY COIL
VELOCITY COIL
METRISITE PRIMARY
METRISITE SECONDARY
DRIVE COIL
VIEW-A
POWER TRANSFORMER CL-210659
CABLE ASST CL-710731-1
STEPPER MOTOR 697788
SM 1
POWER SUPPLY 1 ±15V CL-812695
297719
FAN 1
100, 120, 220, 240 V.A.C. VOLTAGE SELECTOR BOARD CL-810466
5V POWER SUPPLY CL-812811
POWER ENTRY MODULE
3400 MOTHER BOARD ASST. 897651
REF CARD CAGE BACKPLANE
STEPPER 897638
CONTROLLER 897637
37 PIN D CONN., REMOTE CONN. (MALE)
STANDARD INTERFACE CL-810312
37 PIN D CONN., PREAMP CONN. (FEMALE)
SERVO 1
BNC, MONITOR OUTPUT
MICROPHONE JACK, CAL. INPUT
SERVO 2
BNC, MONITOR OUTPUT
MICROPHONE JACK, CAL. INPUT
SERVO DRIVE 1 & 2 897406
CABLE ASST. CL-610559-7
PEN MOTOR CL-810229
PH 1
PH 2
100MM
SEE VIEW A
THERMAL PEN 1 CL-710553 100MM
THERMAL PEN 2 CL-710553 100MM
ANNOTATION HEAD STANDARD CL-610594
PEN LEAD RETAINER BOARD CL-811348
CABLE ASSY. CL-611356-7
CABLE ASST CL-611358-7
PEN HEAT CONTROL CHANNELS 1 & 2 897809
EVENT PEN 1 CL-710551
(OPTIONAL)
ANNOTATION HEAD 1 CL-610594
EVENT MARKER 1 CL-710165
INTERCHANNEL ANNOTATION DRIVES 1 & 2 CL-810191
3400 MOTHER-IN-LAW BOARD ASSY. 897812
REF TRANSPORT INTERCONNECT
"TABLE OPEN" SENSOR 298042
"PAPER OUT" SENSOR CL-810240
PAPER SUPPLY SENSOR 897635
PAPER MOTION SENSOR CL-810290
CABLE ASST. 897812
CABLE ASST. CL-610338
EVENT PEN STANDARD CL-710551
SIGNAL CABLE CL-710520-1
EVENT MARKER STANDARD CL-710165
CABLE ASST. CL-710329
KEYBOARD/ DISPLAY 897844-2
35-V8420-00
MODEL NO. 30-V8420-00
SCHEMATIC OVERALL
Gould Inc. Instruments Division Cleveland, Ohio 44114 U.S.A.
CL-211534
96795
6
CL-211534


REVISIONS
SYM | DESCRIPTION | DATE
A-1 CL-711590 WAS: CL-611590
A-2 CL-811640 WAS: CL-810437
PER DCN. 34140 J. KOCHIS
B CL-812695 WAS 897867
CL-812811 WAS 897515
DCN35398 CZECH 12-9-88
PREAMP CH./SLOT 4
PREAMP CH./SLOT 3
PREAMP CH./SLOT 2
PREAMP CH./SLOT 1
3400 MOTHER BOARD CL-811640
REF: PREAMP BACKPLANE
CL-711590
FAN 3
(OPTIONAL)
3200/3400 CONTROLLER CL-810541
CABLE ASSY. CL-710732-1
CABLE ASSY. CL-610814
SYNC INPUT (CHASSIS MOUNTED, FEMALE BNC)
3400 INTERCONNECT CL-810438
AUXILLARY ANALOG OUTPUT CL-810439
POWER TRANSFORMER CL-210659
CABLE ASSY. CL-710731-1
POWER SUPPLY 2 ±15V CL-812695
POWER SUPPLY 1 ±15V CL-812695
STEPPER MOTOR 697788
SM 1
297719 FAN 1
100, 120, 220, 240 V.A.C. VOLTAGE SELECTOR BOARD CL-410466
5V POWER SUPPLY CL-812811
POWER ENTRY MODULE
STEPPER 897650
CONTROLLER 897637
37 PIN D CONN., REMOTE CONN. (MALE)
STANDARD INTERFACE CL-810312
37 PIN D CONN., PREAMP CONN. (FEMALE)
SERVO 1
SERVO 2
SERVO 3
SERVO 4
BNC, MONITOR OUTPUT
MICROPHONE JACK, CAL. INPUT
SERVO DRIVE 1 & 2 897406
SERVO DRIVE 3 & 4 897406
3400 MOTHER BOARD ASSY. 897651
REF: CARD CAGE BACKPLANE
CABLE ASSY CL-610559
PEN MOTOR 896683
PM 1
PM 2
PM 3
PM 4
50MM
SEE VIEW A
THERMAL PEN 1 CL-710552 50MM
THERMAL PEN 2 CL-710552 50MM
THERMAL PEN 3 CL-710552 50MM
THERMAL PEN 4 CL-710552 50MM
ANNOTATION HEAD STANDARD CL-610594
ANNOTATION HEAD 1 CL-610594
ANNOTATION HEAD 2 CL-610594
ANNOTATION HEAD 3 CL-610594
EVENT PEN 1 CL-710551
EVENT PEN 2 CL-710551
EVENT PEN 3 CL-710551
EVENT PEN STANDARD CL-710551
EVENT MARKER 1 CL-710145
EVENT MARKER 2 CL-710145
EVENT MARKER 3 CL-710145
EVENT MARKER STANDARD CL-710145
SIGNAL CABLE CL-710520-1
PEN HEAT CONTROL CHANNELS 1 & 2 897809
PEN HEAT CONTROL CHANNELS 3 & 4 897809
INTERCHANNEL ANNOTATION DRIVES 1 & 2 CL-810191
INTERCHANNEL ANNOTATION DRIVES 3 & 4 CL-810191
3400 MOTHER-IN-LAW BOARD ASSY 897812
REF: TRANSPORT INTERCONNECT
RS232 INTERFACE 897728
IEEE 488 INTERFACE 897727
OPTIONAL INTERFACES USED IN PLACE OF STANDARD INTERFACE CL-810312
PEN MOTOR CONN'S - TYP
DRIVE COIL
RETRISITE SECONDARY
RETRISITE PRIMARY
VELOCITY COIL
VELOCITY COIL
RETRISITE PRIMARY
RETRISITE SECONDARY
DRIVE COIL
VIEW - A
"TABLE OPEN" SENSOR 290042
"PAPER OUT" SENSOR CL-810240
PAPER SUPPLY SENSOR 897635
PAPER MOTION CL-810790
CABLE ASSY. 897912
CABLE ASSY CL-610338
KEYBOARD/ DISPLAY 897864-1
CABLE ASSY. CL-710329
35-V8404-00
MODEL NO. 30-V8404-00
SCHEMATIC, OVERALL
Gould Inc. Instruments Division Cleveland, Ohio 44114 U.S.A.
DWG. NO. CL-211536
CODE IDENT 96795
ISSUE CODE G
KOCHIS 3-9-87
4/87
CL-211536


REVISIONS
SYM | DESCRIPTION | DATE
A-1 CL-711591 WAS: CL-611591
A-2 CL-811619 WAS: CL-810460
PER DCN. 34140 J. KOCHIS
B CL-812695 WAS 897867
CL-812811 WAS 897515
DCN 35398 CZECH
12-9-88
FAN 2
CL-711591
3200 MOTHER BOARD CL-811619
REF: FREAMP BACKPLANE
(OPTIONAL)
3200/3400 CONTROLLER CL-810541
CABLE ASSY. CL-710732-1
CABLE ASSY. CL-610814
SYNC INPUT (CHASSIS MOUNTED, FEMALE BNC)
3200 INTERCONNECT CL-810461
AUXILLARY ANALOG OUTPUT CL-810462
RS232 INTERFACE 897728
IEEE 488 INTERFACE 897727
OPTIONAL INTERFACES USED IN PLACE OF STANDARD INTERFACE CL-810312.
PEN MOTOR CONN'S - TYP
DRIVE COIL
METRISITE SECONDARY
METRISITE PRIMARY
VELOCITY COIL
VELOCITY COIL
METRISITE PRIMARY
METRISITE SECONDARY
DRIVE COIL
VIEW-A
PREAMP CH./SLOT 1
STEPPER MOTOR 697788
SM 1
POWER SUPPLY 1 215V CL-812695
297719 FAN 1
100, 120, 220, 240 V.A.C. VOLTAGE SELECTOR BOARD CL-610466
5V POWER SUPPLY CL-812811
POWER ENTRY MODULE
PEN/PEN TRANSFORMER CL-210659
CABLE ASSY. CL-710731-1
3200 MOTHER BOARD ASSY. 897650
REF: CARD CAGE BACKPLANE
STEPPER 897638
CONTROLLER 897637
37 PIN D CONN., REMOTE CONN. (MALE)
STANDARD INTERFACE CL-810312
37 PIN D CONN., PREAMP CONN. (FEMALE)
SERVO 1
SERVO 2
BNC, MONITOR OUTPUT
MICROPHONE JACK, CAL. INPUT
SERVO DRIVE 1 & 2 897406
CABLE ASSY. CL-610559
PEN MOTOR CL-810229
PM 1
100MM
SEE VIEW A
THERMAL PEN 1 CL-710553 100MM
ANNOTATION HEAD STANDARD CL-610594
PEN HEAT CONTROL CHANNELS 1 & 2 897809
3200 MOTHER-IN-LAW BOARD ASSY. 897811
REF: TRANSPORT INTERCONNECT
"TABLE OPEN" SENSOR 298042
"PAPER OUT" SENSOR CL-810240
PAPER SUPPLY SENSOR 897635
PAPER MOTION SENSOR CL-810290
CABLE ASSY. 897912
CABLE ASSY. CL-610338
KEYBOARD/ DISPLAY
EVENT PEN STANDARD CL-710551
SIGNAL CABLE CL-710520-1
EVENT MARKER STANDARD CL-710145
CABLE ASSY. CL-710329
35-V8210-00
MODEL NO. 30-V8210-00
SCHEMATIC, OVERALL
Gould Inc. Instruments Division Cleveland, Ohio 44114 U.S.A.
DRG. NO. CL-211538
CODE IDENT 96795
ISSUE CODE G
CL-211538


REVISIONS
SYM | DESCRIPTION | DATE
A-1 CL-711591 WAS: CL-611591
A-2 CL-811619 WAS: CL-810460
PER DCN 34140 J. KOCHIS
B CL-812695 WAS 897867
CL-812811 WAS 897515
DCN 35390 CZECH
CL-711591
FAN 2
3200 MOTHER BOARD CL-811619
REF: PREAMP BACKPLANE
(OPTIONAL)
3200/3400 CONTROLLER CL-810541
CABLE ASSY. CL-710732-1
CABLE ASSY. CL-610814
SYNC INPUT (CHASSIS MOUNTED, FEMALE BNC)
PREAMP CH./SLOT 2
PREAMP CH./SLOT 1
3200 INTERCONNECT CL-810461
AUXILLARY ANALOG OUTPUT CL-810462
RS232 INTERFACE 897728
IEEE 488 INTERFACE 897727
OPTIONAL INTERFACES USED IN PLACE OF STANDARD INTERFACE CL-810312.
PEN MOTOR CONN'S - TYP
DRIVE COIL
METRISITE SECONDARY
METRISITE PRIMARY
VELOCITY COIL
VELOCITY COIL
METRISITE PRIMARY
METRISITE SECONDARY
DRIVE COIL
VIEW-A
STEPPER MOTOR 697788
SW 1
POWER SUPPLY 1 ±15V CL-812695
CABLE ASSY. CL-710731-1
POWER TRANSFORMER CL-210659
297719 FAN 1
100, 120, 220, 240 V.A.C. VOLTAGE SELECTOR BOARD CL-410466
SW POWER SUPPLY CL-812811
POWER ENTRY MODULE
STEPPER 897658
CONTROLLER 897637
37 PIN D CONN., REMOTE CONN. (MALE)
STANDARD INTERFACE CL-810312
37 PIN D CONN., PREAMP CONN. (FEMALE)
SERVO 1
BNC, MONITOR OUTPUT
MICROPHONE JACK, CAL. INPUT
SERVO 2
BNC, MONITOR OUTPUT
MICROPHONE JACK, CAL. INPUT
SERVO DRIVE 1 & 2 897406
3200 MOTHER BOARD ASSY. 897650
REF: CARD CAGE BACKPLANE
CABLE ASSY. CL-610559
PEN MOTOR 896683
PM 1
PM 2
50MM
SEE VIEW A
THERMAL PEN 1 CL-710552 50MM
THERMAL PEN 2 CL-710552 50MM
ANNOTATION HEAD STANDARD CL-610594
(OPTIONAL)
ANNOTATION HEAD 1 CL-610594
EVENT PEN 1 (CL-710551)
EVENT MARKER 1 (CL-710145)
PEN HEAT CONTROL CHANNELS 1 & 2 897809
INTERCHANNEL ANNOTATION DRIVES 1 & 2 CL-810191
EVENT PEN STANDARD CL-710551
EVENT MARKER STANDARD CL-710145
SIGNAL CABLE CL-710520-1
3200 MOTHER-IN-LAW BOARD ASSY. 897811
REF: TRANSPORT INTERCONNECT
"TABLE OPEN" SENSOR 298042
"PAPER OUT" SENSOR CL-810240
PAPER SUPPLY SENSOR 897635
PAPER MOTION SENSOR CL-810290
CABLE ASSY. 897912
CABLE ASSY. CL-610338
CABLE ASSY. CL-710329
KEYBOARD / DISPLAY 897843-1
35-V8202-00
MODEL NO. 30-V8202-00
SCHEMATIC, OVERALL
Gould Inc.
Instruments Division
Cleveland, Ohio 44114 U.S.A.
DWG. NO. CL-211540
CODE IDENT 96795
SIZE G
CL-211540



REVISIONS		
SYM	DESCRIPTION	DATE
A-1	ORIG. REL. ISSUE LEVEL/A.J.S.	4-27-87
B-1	REVISED PER DCN 34380/A.J.S.	9-25-87
C	REVISED PER DCN 34608/B.K.	1-5-88

CL-211619

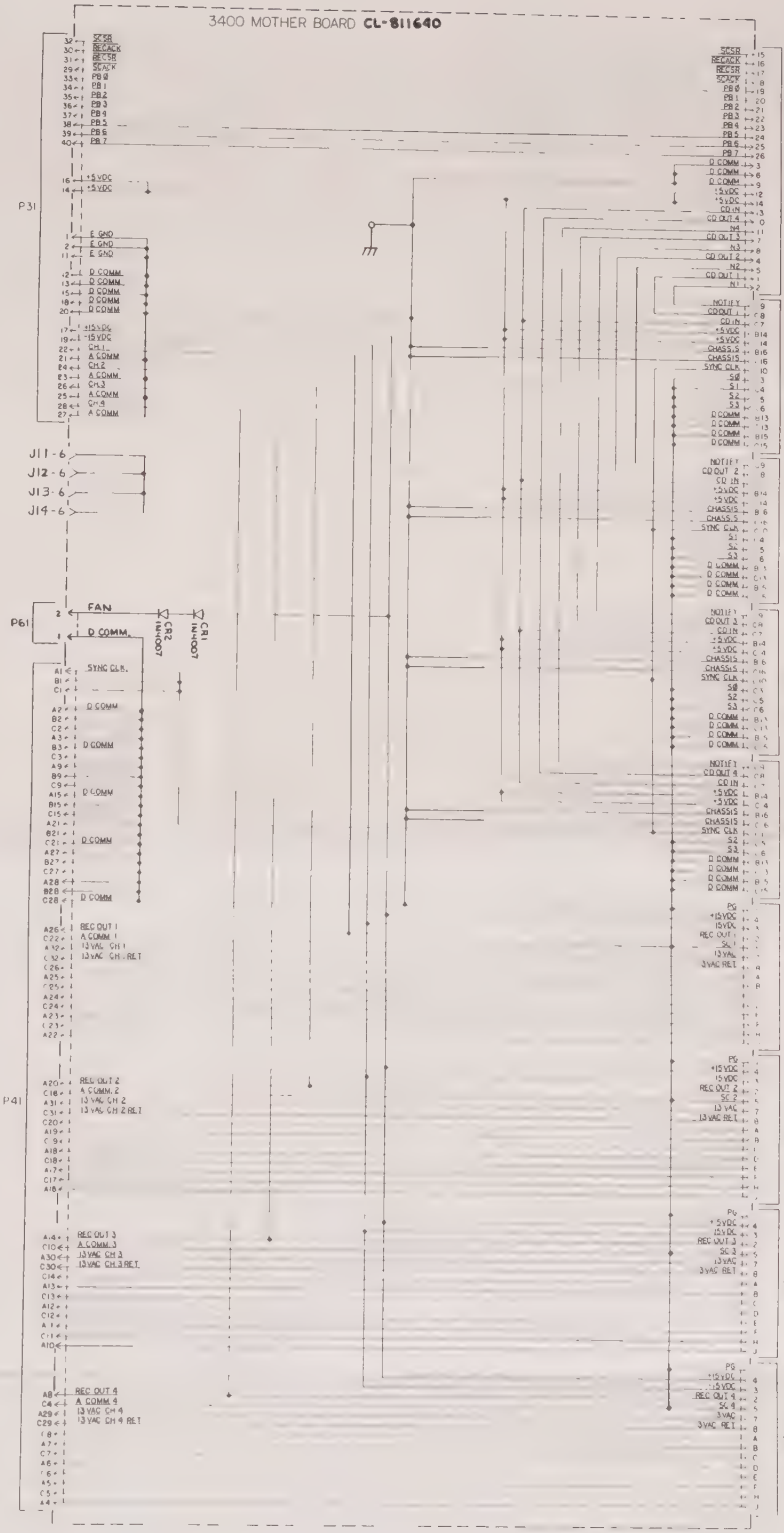
BOARD ASS'Y., 3200 MOTHER CL-811619

BY	DATE	NAME
DR A. SOTEROS	4-27-87	SCHEMATIC
CHK K. SWER	4-27-87	
APP		

Gould Inc
Instruments Division
Cleveland, Ohio 44114 U.S.A.

DWG. NO. CL-211619

CODE IDENT 96795 | ISSUE CODE G



REVISIONS			
PTM	DESCRIPTION	DATE	
A-1	ORIG. REL. ISSUE LEVEL/A-1	9-27-87	MF
B-1	REVISED PER DCN 24381/A-1-3	9-24-87	
C-1	REVISED PER DCN #6097/J.G. K	12-7-87	

BOARD ASSY., 3400 MOTHER CL-811640

SCHEMATIC

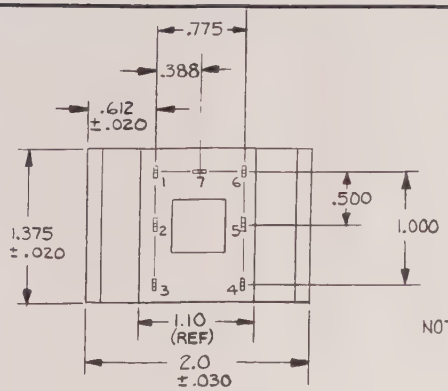
Control Inc. Instruments Division Cleveland, Ohio 44114 U.S.A.

CL-211640

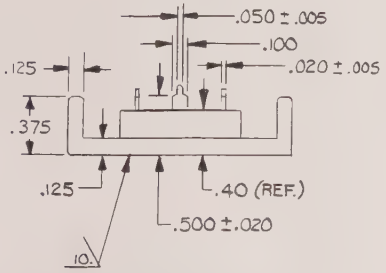
CODE IDENT 96705 | SIZE D | ISSUE G

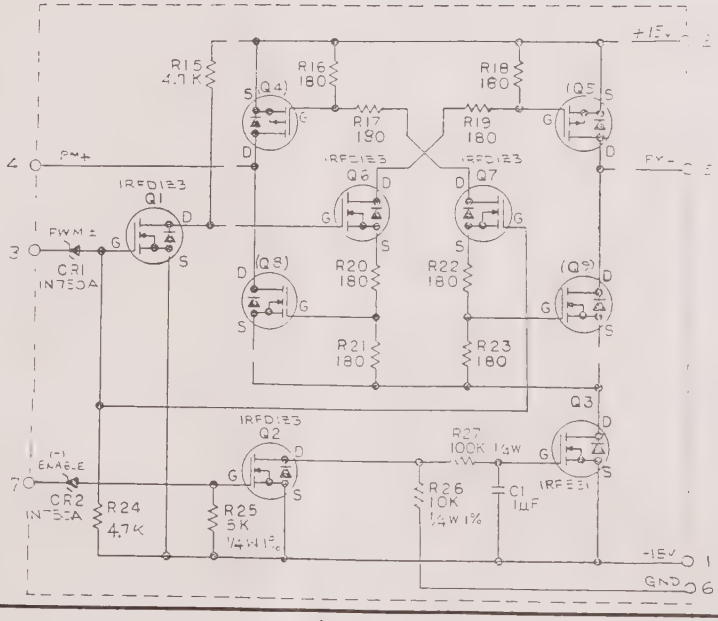
DRAWN A. SOTELO 3-17-87 | CHECKED | ENGR | MFG | QUAL

CL-211640



NOTE : RECOMMENDED HOLE DIA.
FOR LEADS IS .067.





10. THIS SURFACE OF HEATSINK TO BE STAMPED IN WHITE LETTERING "GOULD INC." IN 12 POINT FONT (MIN.) WITH BOTTOM ORIENTATION TOWARD PIN 7. ALSO INCLUDE GOULD PT. NO. CL-212103
9. UNLESS OTHERWISE INDICATED: ALL RESISTANCE IN OHMS
ALL RESISTORS 1/2W, 5%
8. "Q" NUMBERS IN () ARE VENDOR IDENTIFICATION INSIDE U1 PACKAGE
7. HEATSINK BLACK ANODIZED PER TYP. COMMERCIAL STANDARDS.
6. ALL DIM. ±.010 UNLESS OTHERWISE NOTED.
5. WITH PIN 7 AT 0v, OUTPUT CURRENT = ± 1 MILLIAMPERE MAX.
4. MAX. DESIGN OUTPUT CURRENT, ± 3 AMPS (PIN 7 AT -10v DC, PIN 3 AT 11v DC.)
3. DESIGN OUTPUT LOAD, 10 OHMS RESISTIVE IN SERIES WITH 3mh INDUCTANCE AT TERMINALS 4&5.
2. OTHER RESISTORS ARE 5% TOL, 1/4 WATT MIN.
1. R16-R23 ARE 5% TOL, 1/2 WATT MIN.

NOTES:

REVISIONS		
SYM.	DESCRIPTION	APPROVAL

COMM CLASS	PROPRIETARY
UNLESS OTHERWISE INDICATED, MANUFACTURER'S DIMENSIONAL TOLERANCES APPLY.	
NAME	HYBRID CIRCUIT, MOSFET OUTPUT AMP

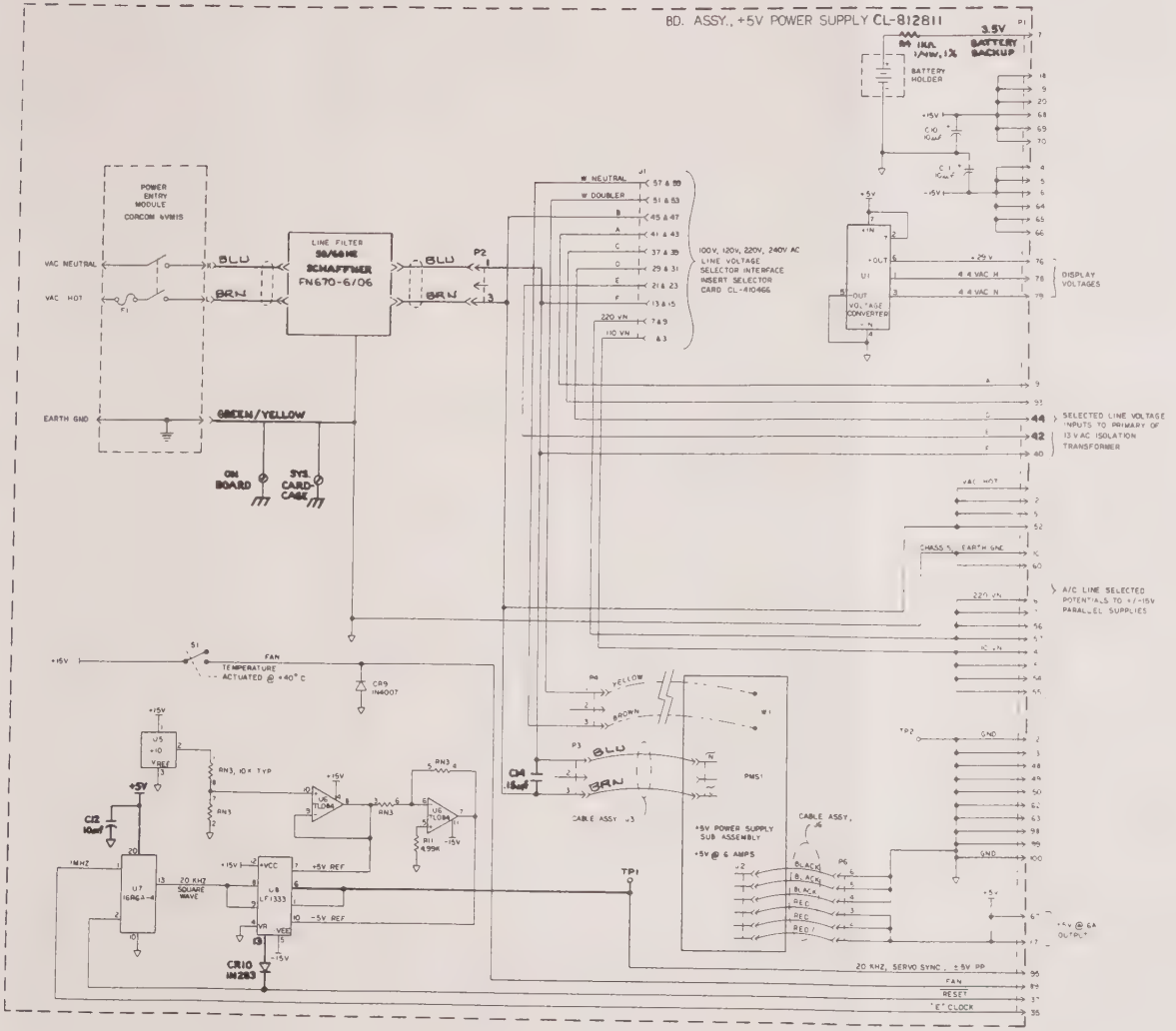
BY	DATE
DR P. SMITH/ RIVERA	9-8 -88
CH	9-8-88
APP P A Smith	9-8-88

Gould Inc.
Instruments Division
Cleveland, Ohio 44114 U.S.A

DWG. NO. CL-212103

CL-212103

Form 2.3 2-80



REVISIONS		
SYM	DESCRIPTION	DATE
A	ORIGINAL RELEASE ISSUE LEVEL	11-11-88
B	NOT AFFECTED PER DCN 35590	5-22-89
C	REV'D PER DCN 35782, LK	9-21-89

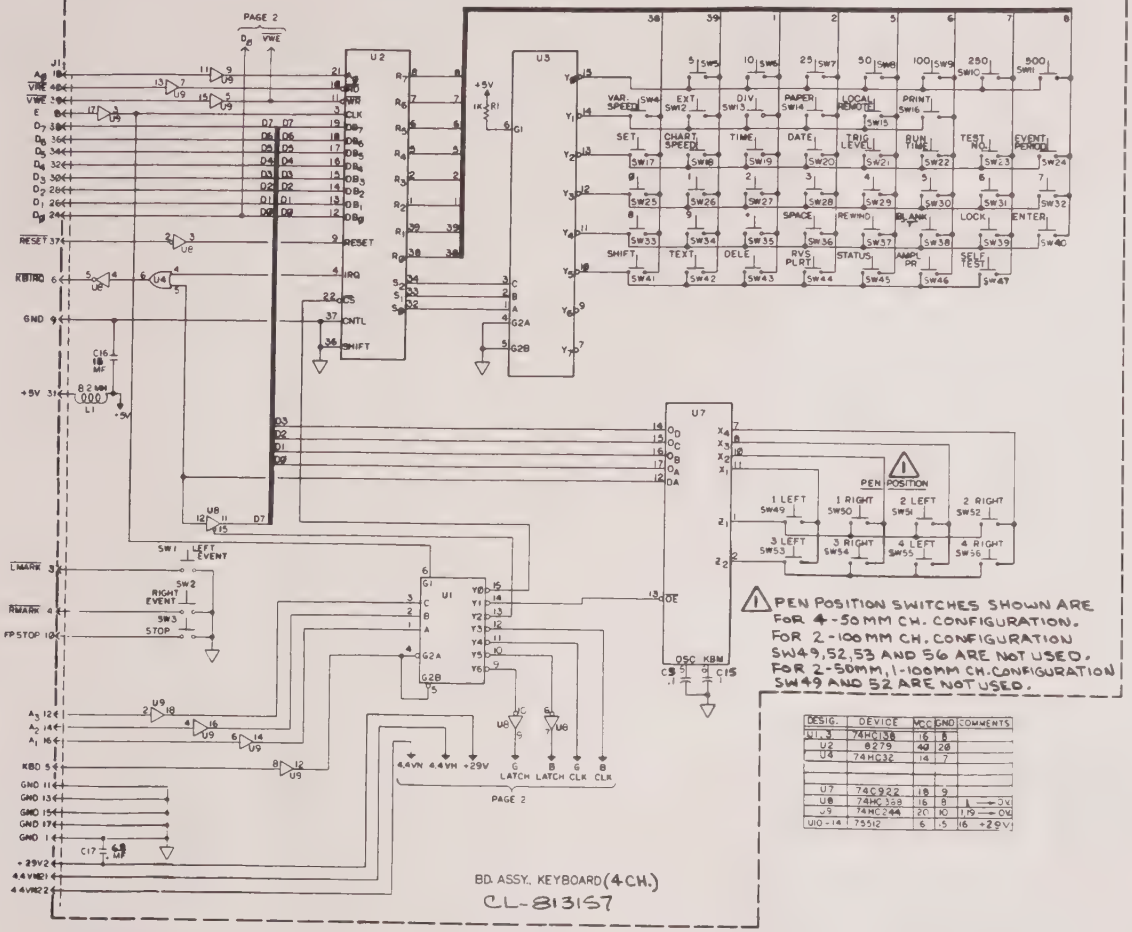
MF
MF

CL-212811

BOARD ASS'Y., +5V POWER SUPPLY CL-812811

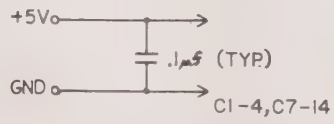
BY	DATE	NAME	
DR A SOTEROS	11-11-88	SCHEMATIC	Gould Inc Instruments Division Cleveland Ohio 44114 U.S.A.
CHK	11-11-88		
APP		CODE IDENT 96795	ISSUE CODE G
MFG			DWG. NO. CL-212811

REVISIONS		
SYM	DESCRIPTION	DATE
A	ORIG. REL. ISSUE LK	6-15-89
B	UDT AFFECTED PER DCN 35823. LK	7-22-90



⚠ PEN POSITION SWITCHES SHOWN ARE FOR 4-50MM CH. CONFIGURATION. FOR 2-100MM CH. CONFIGURATION SW49,52,53 AND 56 ARE NOT USED. FOR 2-50MM, 1-100MM CH. CONFIGURATION SW49 AND 52 ARE NOT USED.

DESIG.	DEVICE	VCC	GND	COMMENTS
U1, 3	74HC138	16	8	
U2	8279	40	20	
U4	74HC32	14	7	
U7	74C922	18	9	
U8	74HC132	16	8	1 → -5V
U9	74HC244	20	10	1,19 → 0V
U10-14	75512	6	5	16 +29V

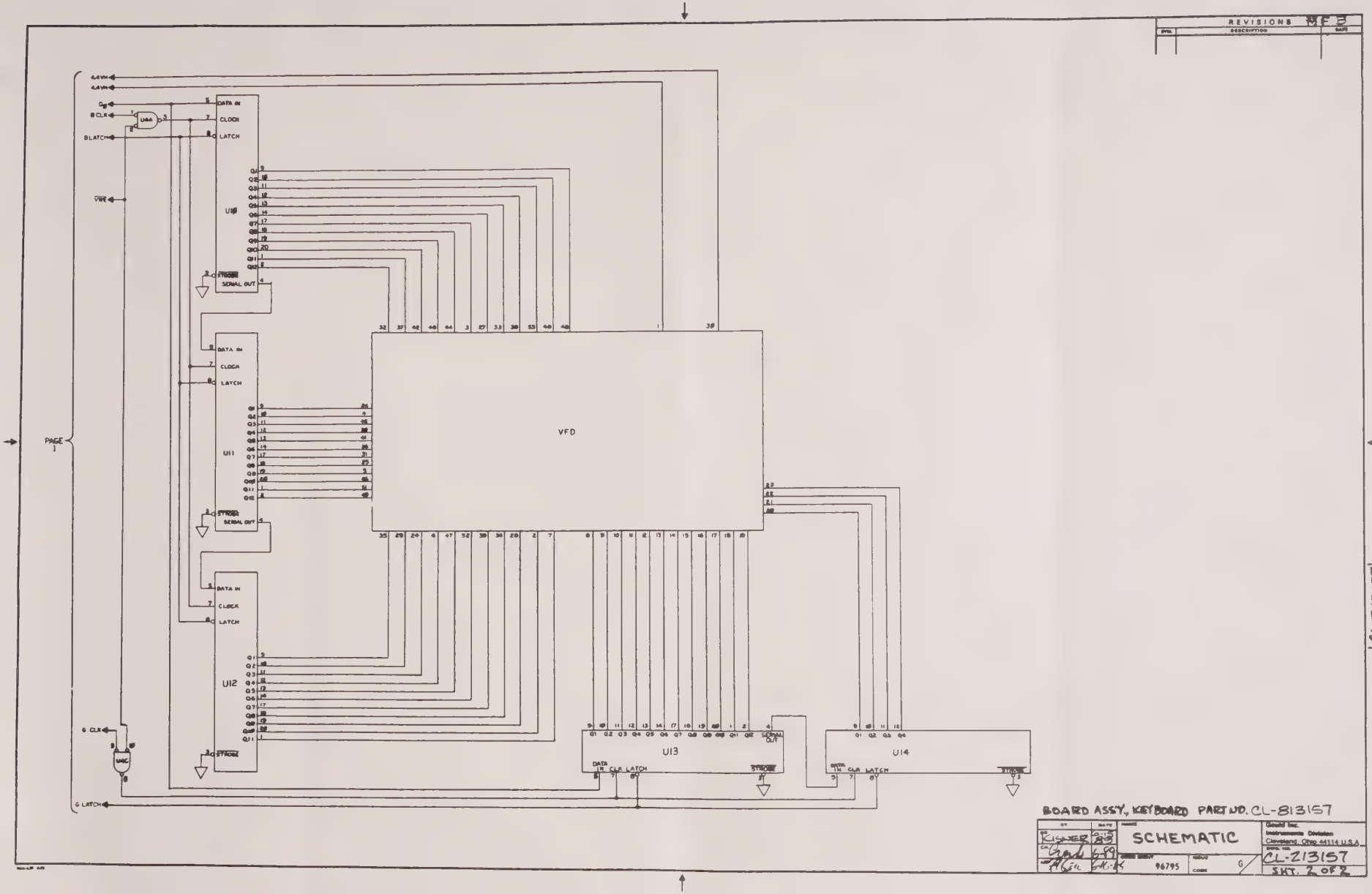


NOTE UNLESS OTHERWISE INDICATED:
ALL CAPACITANCE IN MICROFARADS.
ALL RESISTANCE IN OHMS.
ALL RESISTORS .15 WATT, 2%.

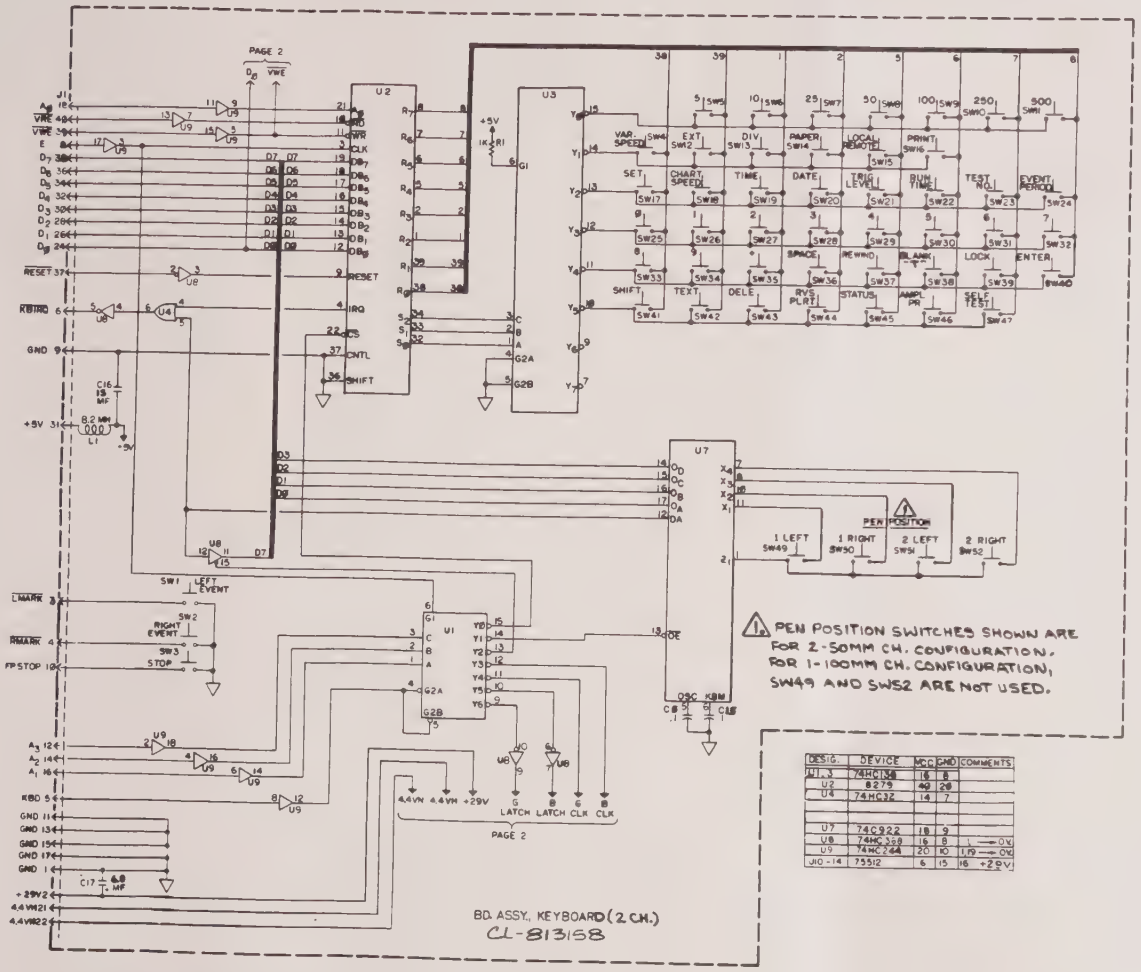
BOARD ASSY., KEYBOARD PART NO. CL-813157

DD LISNER 10-15-89	NAME SCHEMATIC	Gould Inc. Instruments Division Cleveland, Ohio 44114 U.S.A.	
CH [illegible] 6-89	CODE IDENT 96795	ISSUE CODE G	DWG. NO. CL-213157
[illegible] 6-15-89			SHT. 1 OF 2

CL-213157

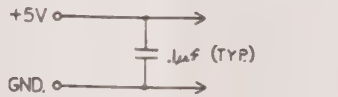

REVISIONS
SYM. DESCRIPTION DATE
4.4VH
4.4VH
DIG
BCLK
BLATCH
VBE
U10A
DATA IN
CLOCK
LATCH
U10
STROBE
SERIAL OUT
U11
U12
VFD
PAGE 1
GCLK
U10C
GLATCH
U13
U14
DATA IN CLR LATCH
STROBE
SERIAL OUT
BOARD ASSY, KEYBOARD PART NO. CL-813157
SCHEMATIC
Gould Inc.
Instruments Division
Cleveland, Ohio 44114 U.S.A.
CL-213157
SHT. 2 OF 2
96795
G
12-23-71

REVISIONS		
SYM.	DESCRIPTION	DATE
A	ORIG. REL. / ISSUE. LK	2-20-87
B	NOT AFFECTED PER DCN 35826. LK	2-22-88



⚠1 PEN POSITION SWITCHES SHOWN ARE FOR 2-50MM CH. CONFIGURATION. FOR 1-100MM CH. CONFIGURATION, SW49 AND SW52 ARE NOT USED.

DESIG.	DEVICE	VCC	GND	COMMENTS
U1, 3	74HC138	16	8	
U2	8279	40	20	
U4	74HC32	14	7	
U7	74C922	18	9	
U8	74HC368	16	8	L → 0V
U9	74HC244	20	10	L/H → 0V
J10 - 14	75512	6	15	16 +28V



BD. ASSY., KEYBOARD (2 CH.)
CL-813158

NOTE: UNLESS OTHERWISE INDICATED:
ALL CAPACITANCE IN MICROFARADS.
ALL RESISTANCE IN OHMS.
ALL RESISTORS .19 WATT, 2%.

CL-213158

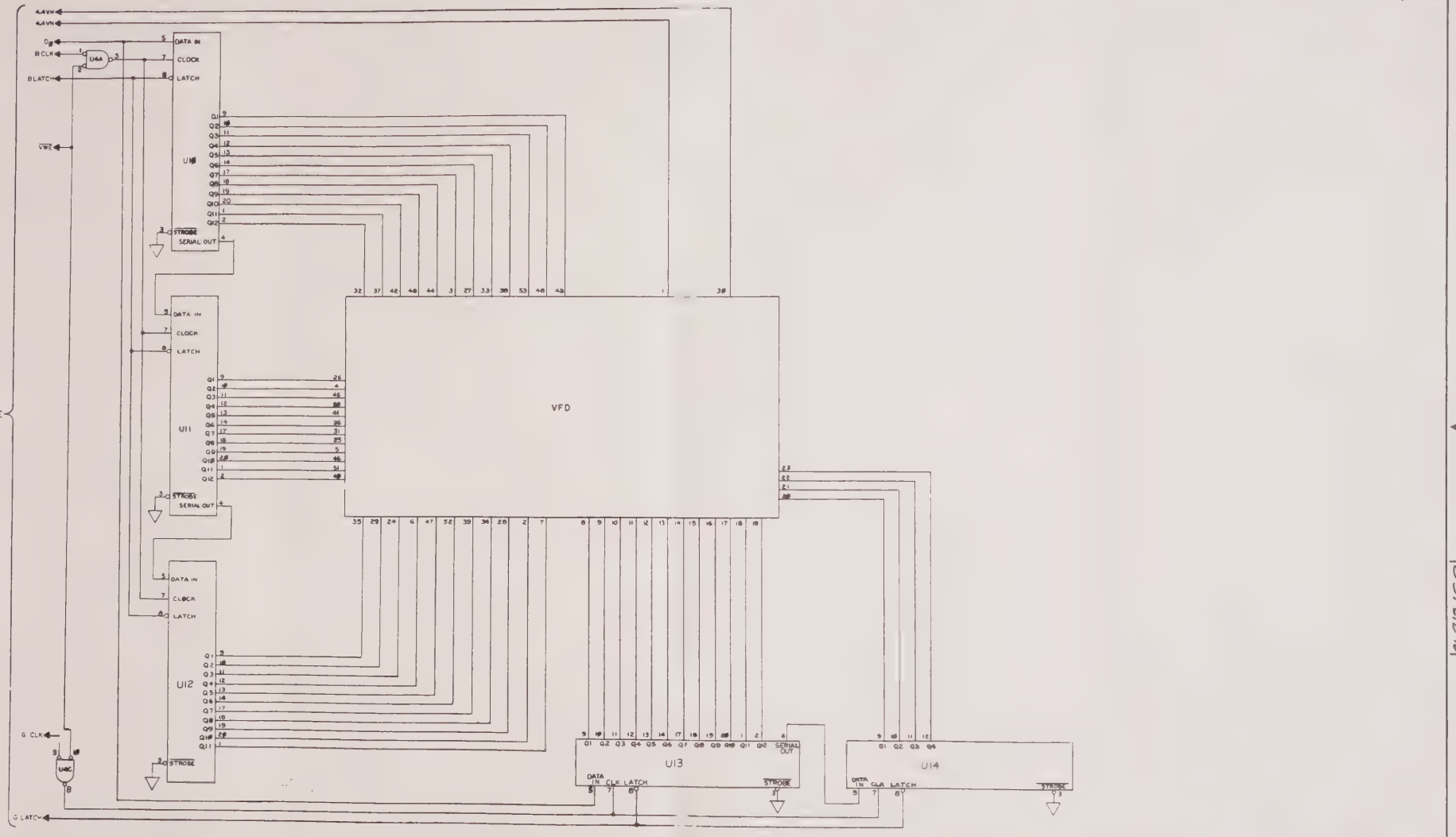
BOARD ASSY, KEYBOARD, 2CH. CL-813158

BY	DATE	NAME
DR Kuyper	6-88	SCHEMATIC
CH Lynch	6-88	
K. Gwin	6/88	

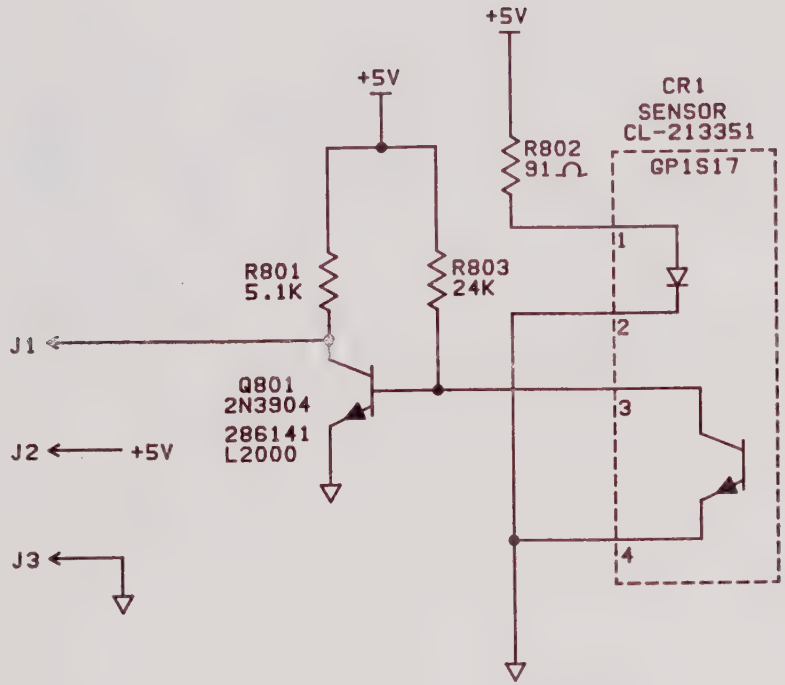
Gould Inc. Instruments Division Cleveland, Ohio 44114 U.S.A.

CODE IDENT	ISSUE CODE	DWG. NO.
96795	G	CL-213158

SHT. 1 OF 2


REVISIONS
ZONE
DESCRIPTION
DATE
B MP
4.4VH
4.4VN
DIN
BCLK
BLATCH
VWE
U44
U10
U11
U12
U13
U14
DATA IN
CLOCK
LATCH
STROBE
SERIAL OUT
VFD
G CLK
G LATCH
CLR
SERIAL OUT
PAGE 1
12-13/58
SCHEMATIC
DR KISNER 6-29-89
CH Jenk 6-89
CODE IDENT 96795
SIZE G
Gould Inc
Instruments Division
Cleveland, Ohio 44114 U.S.A.
DWG NO. CL-Z13158
SHT. 2 OF 2

ON CAD/CAM SYS.



1. ALL RESISTORS ARE 1/4W, ±5%

NOTES:

BOARD ASSY., SENSOR CL-813345

BY DUPAL	DATE	SCHEMATIC	GOULD INC. RECORDING SYS. DIV. Cleveland, Ohio 44114 U.S.A.
CH			DWG. NO. CL-213345
APP			

CL-213345

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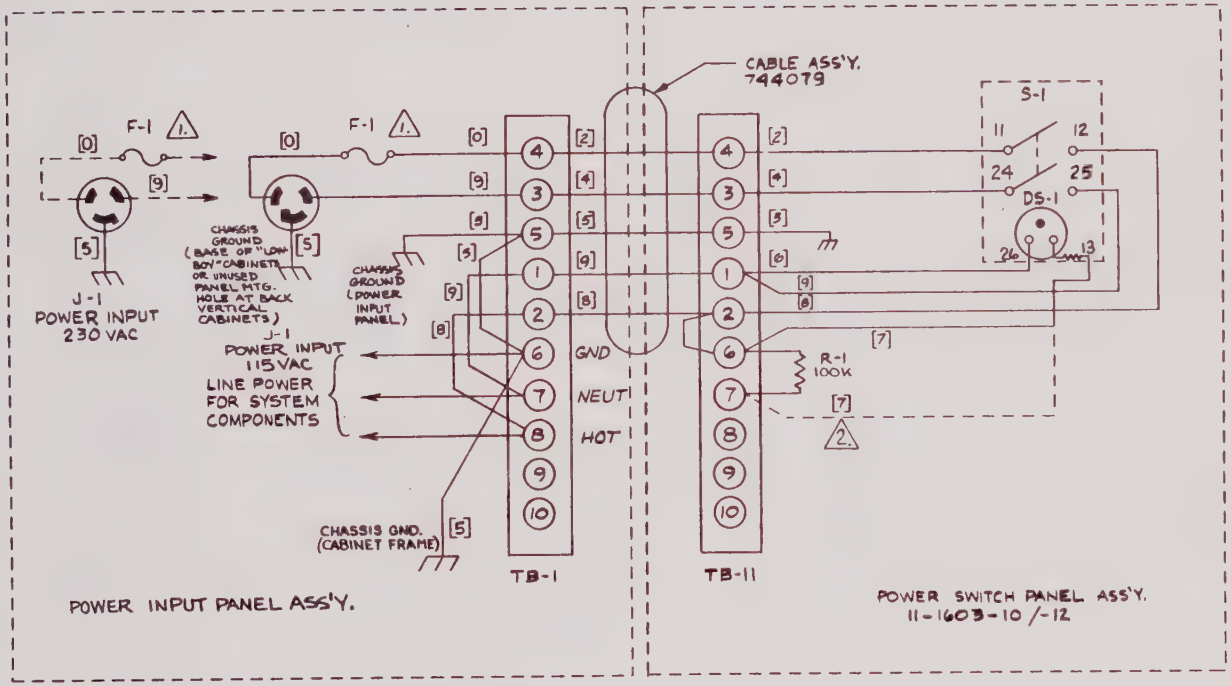
J-1	REV'D PER DCN 32445	RIVERA	11-22-83	MF



3. [ ] = EIA COLOR CODE.

2. FOR 230V OPERATION, MOVE WIRE [7] FROM TERMINAL 6 TO TERMINAL 7 OF TB-11.

1. FUSE RATING: 884208-1 & -5 (115 VAC) - 10A
884208-6 (230 VAC) - 5A

NOTES:

REQD	ITEM	PART NUMBER	DESCRIPTION	REMARKS	CML

LIST OF MATERIAL

S-2030 FIRST USE

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES AND INCLUDE PLATING
.XXX = ± .005 SURFACE
.XX = ± .015 FINISH
.X = ± .06 ANGLES = ± 0° 30'
SEE WORKMANSHIP STD-TITLED "MFG. TOLERANCES & STD'S.," WHEN DESIRED INTENT IS NOT CLEARLY DEFINED ON DRAWING.

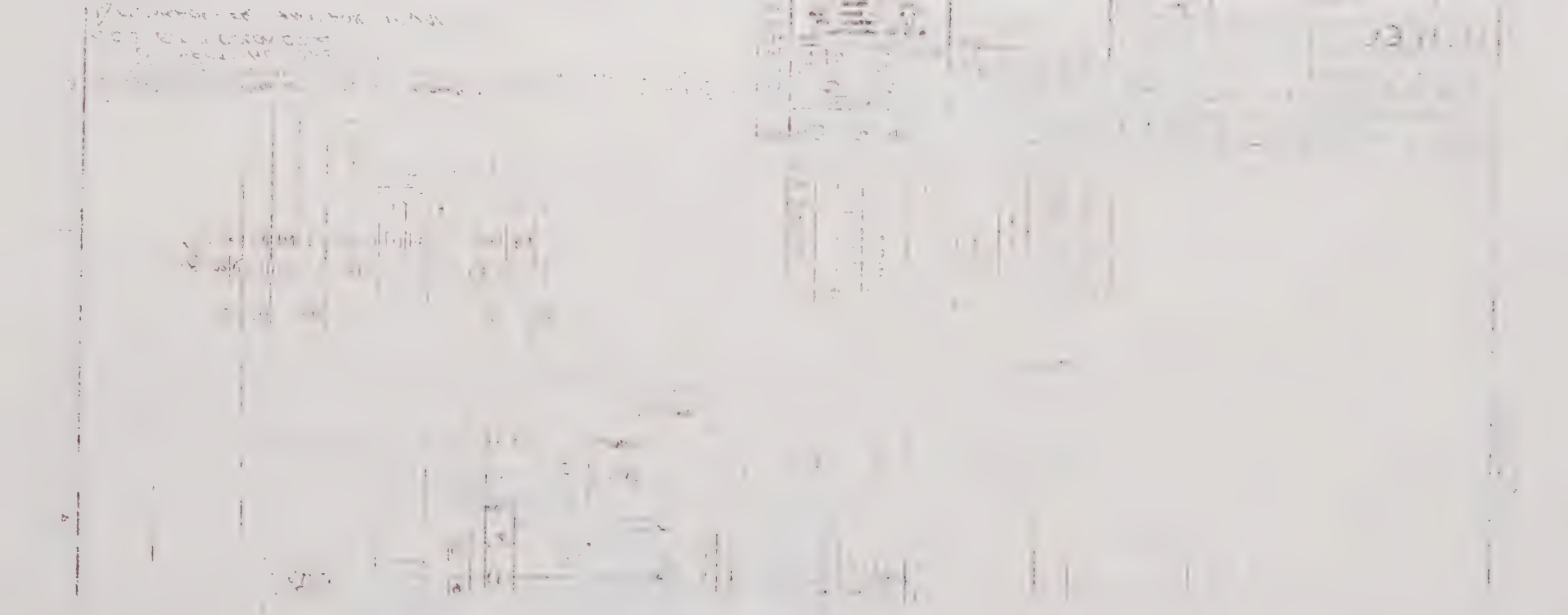
	BY	DATE
DR.	FOWLER	5-25-73
CH.		
APP.	KLOSS	9-17-73
MATL.	NONE	

NAME: DIA., WIRING - POWER KIT
ADD FIN.: NONE
ISSUE CODE: G
SCALE: NONE

Gould Inc.
Instruments Division
Cleveland, Ohio 44114 U.S.A.

DWG. NO. 384919
FED CODE NO 96795

384919



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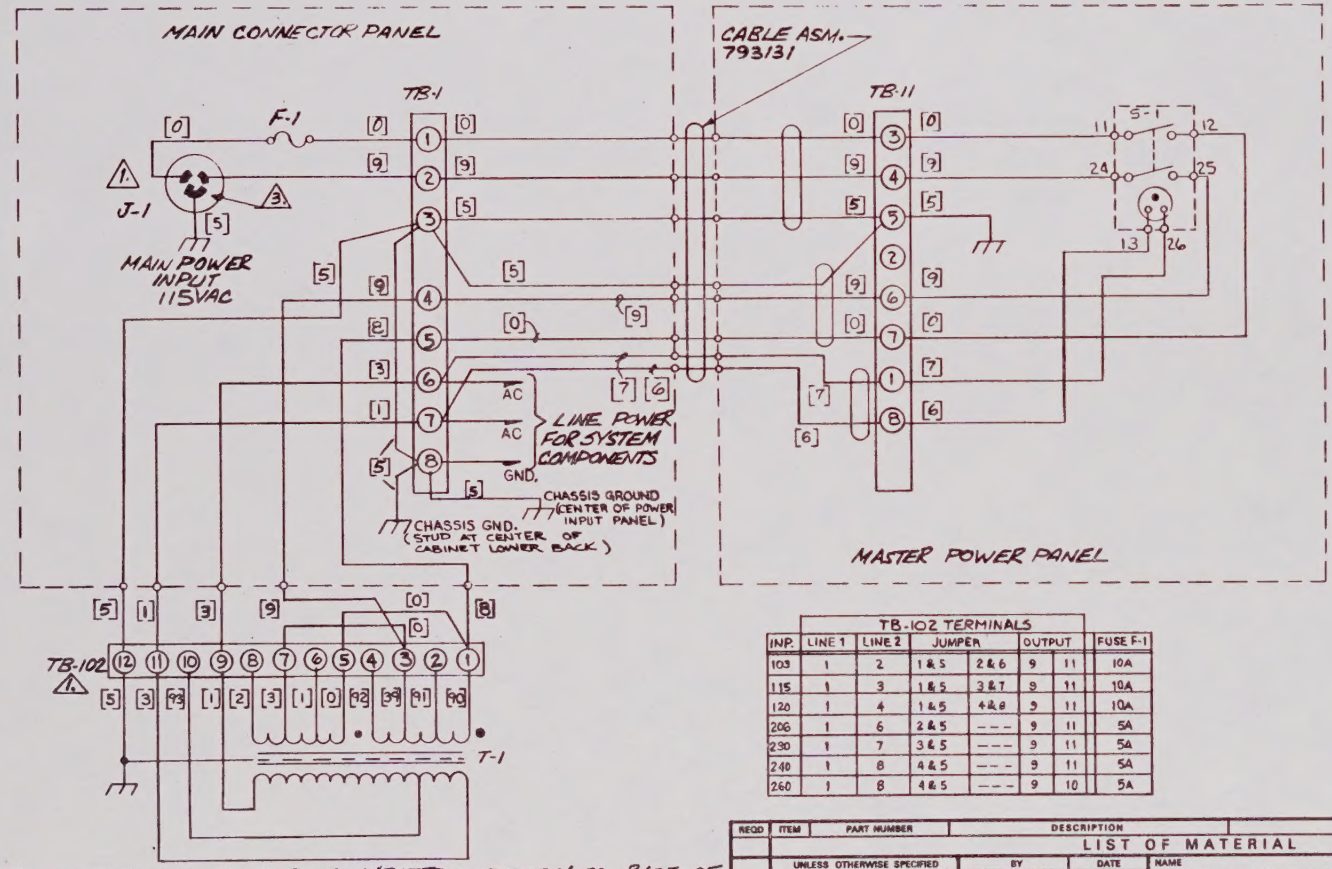
H-1	REV'D TB-1 PER DCN 32541	RIVERA	12-11-85	MF



TB-102 TERMINALS						
INP.	LINE 1	LINE 2	JUMPER		OUTPUT		FUSE F-1
103	1	2	1&5	2&6	9	11	10A
115	1	3	1&5	3&7	9	11	10A
120	1	4	1&5	4&8	9	11	10A
206	1	6	2&5	---	9	11	5A
230	1	7	3&5	---	9	11	5A
240	1	8	4&5	---	9	11	5A
260	1	8	4&5	---	9	10	5A

NOTES:

1. TRANSFORMER SHOWN FOR 115VAC POWER INPUT.
2. [ ] = E.I.A. COLOR CODE.
3. GROUND TERMINAL MUST BE CONNECTED DIRECTLY TO BASE OF "LOWBOY" CABINETS OR TO UNUSED PANEL MOUNTING HOLE OF VERTICAL CABINETS.

REQD	ITEM	PART NUMBER	DESCRIPTION	REMARKS	CML

LIST OF MATERIAL

893136 FIRST USE

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES AND INCLUDE PLATING
.XXX = ± .005 SURFACE FINISH
.XX = ± .016
.X = ± .06 ANGLES = ± 0° 30'

MACH. WORKMANSHIP STD - TITLED "MFG. TOLERANCES & STD'S..." WHEN DESIGN INTENT IS NOT CLEARLY DEFINED ON DRAWING.

	BY	DATE
DR.	D BAILEY	5-1-79
CH.	[illegible]	6-8-79
APP.	[illegible]	6-8-79

ADD. FIN. NONE

NAME WIRING DIAGRAM POWER KIT

Gould Inc. Instrument Systems Division Cleveland, Ohio 44114 U.S.A.

FED. CODE NO. 96795

ISSUE CODE G

SCALE NONE

DWG. NO. 393130

393130

Form 3.19 1-76

www.manualsplus.com
1026303

Gould Inc., Test & Measurement Group
8333 Rockside Road, Valley View, Ohio 44125
Telephone (216) 328-7000

GOULD
Electronics